MODERN PLASTICS

mp

JANUARY 1950

PLASTICS BUILD
BETTER PRODUCTS
AND
BETTER VALUES

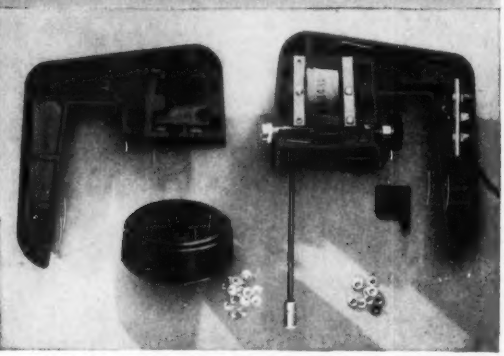
It pays to use your custom molder's know-how

— and give your sales a shot in the arm

No. 13 in a series on Plastics Skill at Work...

PRODUCT: Electric Sprayer for Household Use
CUSTOMER: Handicraft Division of Burgess Battery Co.
MOLDER: Eclipse Manufacturing Co.
MATERIAL: Durez phenolic housing, handle, and fittings.

BEFORE AND AFTER comparison shows enormously increased sales appeal obtained in redesign of Burgess Battery Company's "Vibro-Sprayer." Durez plastic enabled designers to suggest simplicity and ease of use in exterior lines of the unit.



CUT-AWAY reveals complicated shapes with bosses and recesses obtained by the molder in single forming operation. Assembly jigs formerly required are no longer needed. Durez is self-insulating, an added time-saver.

Front and center display in retail stores today is worth a lot of money, and the Handicraft Division of Burgess Battery Company is among the manufacturers who are using Durez plastics to get more of it.

Taking a completely fresh approach to the matter of exterior shape, this company evolved a compact electric sprayer design that suggests (and has) the efficiency of pistol-trigger operation. People just naturally reach for it, buy it, and take it home to save time in painting, insect control, disinfecting, and other household, shop and farm spraying jobs.

The molding process, and the engineering skill of an experienced custom molder, made it possible to produce this new shape at mass-market cost.

Whenever you want to reawaken interest in your products, consider *first* the inherent advantages of molded Durez. Durez allows your designers the freedom of imagination they need, permits the faster production you will want. It has excellent mechanical, electrical, and chemical properties, and comes from the mold with a permanent lustrous finish.

Durez field technicians are always on call for productive consultation with you and your molder.

A hit with plastics users everywhere is the handy "Durez Check-Chart." Write for yours. Durez Plastics & Chemicals, Inc., 121 Walck Rd., N. Tonawanda, N. Y.

DUREZ

PHENOLIC RESINS
- MOLDING COMPOUNDS
- INDUSTRIAL RESINS
- PROTECTIVE COATING RESINS

PHENOLIC PLASTICS THAT FIT THE JOB

ACE *Quality* CHOOSES

Catalin

RESEARCH ENDORSES ITS JUDGMENT

You are viewing the Ace Homemaker Gift Set of matched Kitchen Tools as created for the quality-market by Ace Products Company, Philadelphia, Pa. Each carefully engineered design, which was first thoroughly researched and exhaustively home-tested, constitutes an impressive endorsement for Catalin. These highly polished (far easier cleaning and longer life) tools have twin-sided, beveled handles of ivory Catalin, fastened in place with nickle-silver rivets and tapped at the end with hanger-hole. In the *handling* of housewares, Catalin is every-way best. Among all consumers, as among those who pre-tested the Ace offering, Catalin is accepted as plastics' finest! When planning your next product, we suggest you investigate Catalin's superior advantages. Write for full particulars. Inquiries invited!

Catalin

CATALIN CORPORATION OF AMERICA

ONE PARK AVENUE • NEW YORK 16, N. Y.

MODERN PLASTICS*

VOLUME 27 JANUARY 1950 NUMBER 5

CONTENTS

Plastics Build Better Products and Better Values

Contents continued on page 5

*Reg. U. S. Patent Office.

They sell faster because *Geon* is in the picture!

LOOK at the variety in these four pictures and you can see why Geon is one answer to the American way of making things better and better values, too.

Geon, the highly-versatile polyvinyl material, comes in many forms including resins, latex, and for those desiring a ready-mixed material—compounded plastics. Here is the variety needed to give you a wide range of treatment, including calendering, extruding, casting or molding.

Investigate Geon's versatile qualities—you can make grease-and-waterproof fabrics, flame-resistant insulation, abrasion-proof hose and many other products of high quality. Is it any wonder that Geon is used in so many articles for the home, industry and business?

Perhaps Geon will spark an idea for you! If so, contact us and our technical service may be able to help develop your idea into practical, saleable form. Write Dept.GA-1, B. F. Goodrich Chemical Company, Rose Building, Cleveland 15, Ohio. In Canada: Kitchener, Ontario.

● *For a baby's bed—an all-plastic fabric tick.*

● *"Portable waterworks"—irrigation hose made from Geon.*

● *Protective and readily identifiable insulation for electrical wires.*

● *A fused non-wilt collar.*

Geon Polyvinyl Materials

B. F. Goodrich Chemical Company A DIVISION OF THE B. F. GOODRICH COMPANY

GEON polyvinyl materials • HYCAR American rubber • GOOD-RITE chemicals and plasticizers

CONTENTS (continued)

PUBLICATION OFFICE: Orange, Conn. Executive and Editorial Office: 122 E. 42nd St., New York 17, N. Y. Published each month by Modern Plastics, Inc. Entered as second class matter at the Post Office at Orange, Conn., under the act of March 3, 1879.

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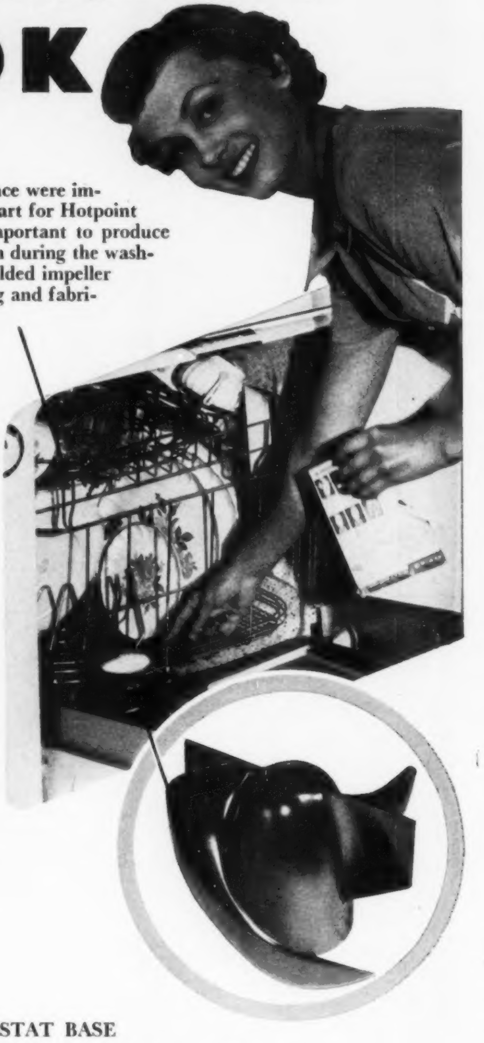
TWO VITAL Hotpoint PARTS OF INSURØK

IMPELLER FOR AUTOMATIC DISHWASHER — Richardson ability and experience were important factors in producing this intricate molded part for Hotpoint Automatic Dishwashers. Precision molding was important to produce a perfectly balanced impeller for high-speed rotation during the washing, rinsing and drying cycles. This Richardson-molded impeller has a smooth finish, requires a minimum of finishing and fabricating operations and is impervious to water and soaps or detergents.



OVEN THERMOSTAT BASE

Richardson knowledge, facilities and skill produced this intricate Bakelite thermostat base for oven controls on the Hotpoint Range. The metal insert is accurately positioned. The electrical and mechanical properties of this Richardson-molded part undergo precision tests following assembly.

Send specifications or blueprints . . . learn, without obligation, how Richardson facilities and services might go to work for you.

INSUROK *by* RICHARDSON
Dependable names in plastics

The RICHARDSON COMPANY

GENERAL OFFICES: LOCKLAND, OHIO   FOUNDED IN 1858

Sales Headquarters: MELROSE PARK, ILLINOIS

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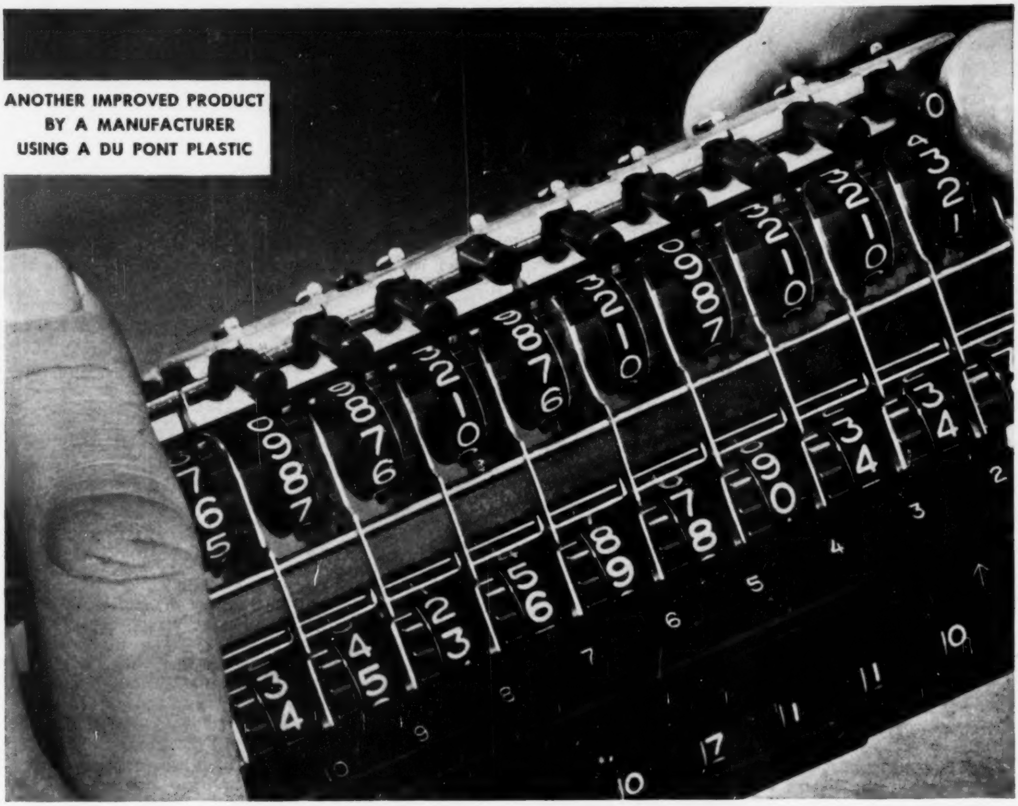
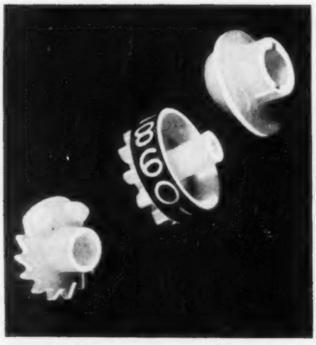


NYLON PLASTIC PARTS FOR MONROE CALCULATORS COST 67% LESS

29 production steps eliminated in making two extra-durable parts to tolerances as close as 0.0015 inch!



NEW NYLON RATCHET, counting dial (one of ten) and cam. Molding of cam saved 19 production steps, of the dials —10 steps. Ratchet is new part, only possible with nylon. Note intricate design, molded to close tolerances.

Here's an excellent example of wedding product-improvement to cost-cutting. The Monroe Calculating Machine Company, by using Du Pont nylon plastic for counting dials and cams on their calculating machines, gets more durable service from these parts—and through savings in material and operations, cuts costs of the completed parts by 67%. Production steps are cut from 33 for former metal parts to only *four* for nylon. A third part, a new ratchet, is of an improved design so intricate it is possible only with nylon.

These nylon parts are molded to tolerances as close as 0.0015 inch. In actual performance tests of millions of cycles—beyond normal machine life—nylon showed hardly any measurable evidence of wear, while wear on metal parts was clearly visible. In addition, the high abrasion resistance of nylon eliminates the need for lubrication and subsequent dial cleaning, affords quieter, smoother operation.

For more information on nylon and other Du Pont plastics write today for free literature. E. I. du Pont de Nemours & Co. (Inc.) Polychemicals Department, (consolidation of the Ammonia and Plastics Departments), Plastics Sales Offices: 350 Fifth Avenue, New York 1, N. Y.; 7 S. Dearborn St., Chicago 3, Ill.; 845 E. 60th Street, Los Angeles 1, Calif.

DU PONT
REG. U. S. PAT. OFF.
Plastics
BETTER THINGS FOR BETTER LIVING
. . . THROUGH CHEMISTRY

EDITORIAL

It's All Based on Better Selling

READING this issue of MODERN PLASTICS, a stranger to economic processes under our free enterprise system would miss a most important point. Plastics build better products and better values only when the salesmen pound pavements to a purpose. That's the point.

Today, five million pounds of phenolics are used annually in the molding of iron handles. Yet it was only some 20 years ago that a young salesman, now a vice president of one of the largest material manufacturing companies, carried a phenolic iron handle around in his brief case for two years, showing it to makers of electric irons, molders, and merchandising people, before he was able to get the first production job started. In 1938 it was more difficult to give away a 10-lb. sample of vinyl chloride than it is to get an order for a quarter of a million lb. of the same material today.

Let not the casual reader be under any illusions: the radio manufacturers and refrigerator makers and all the other users of plastic did not, in many cases, go to material makers and molders and say "Please apply your magic to our problems." On the contrary, not a single major application of plastics has ever been established without benefit of strong and continued sales effort.

Neither consumers nor retailers envisioned superior plastics toys, plastics housewares, or plastics furnishings. The dreams on which those businesses have been built were in the hearts of market-minded men in laboratories, sales offices, and molding and processing plants. In nine cases out of 10, the stymies in original dollar costs, in prejudices based on tradition, in fear of failure, had to be overcome by vigorous and sincere selling on somebody's part.

The war emergency offered some materials a unique opportunity in market development without the need for selling. But anyone who knows his recent plastics history also knows that in 1946 and 1947 strong sales effort had to be put behind those war-born materials in order that broad new groups of applications might be firmly established.

Now in what may become the "Fabulous 50's," in a new decade of development, all who read the happy histories in this issue must remember that nothing happens in our economy until a sale is made! Vast new markets for plastics beckon. Population statistics alone provide a spur to salesmanship.

The business is there, waiting the touch of salesmanship. The engineering has been proved, which it hadn't been back in the 30's when many of our most fundamental plastics applications were established. Thanks to good engineering, the bugaboo of misapplication has been banished. Today's salesman has the accomplishments of the engineer to use as the foundation on which to build more business in plastics.

So fill up the hearts with dreams and the heads with practical ideas and the brief cases with project samples and the mails with sound sales solicitation. Plastics will continue to build better products and better values only if plastics are solidly sold.

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32 Broadway, New York 4, N. Y.
Tel., WHitehall 4-4782

Executive and Editorial Offices
122 E. 42nd St., New York 17, N. Y.
Tel., MUrray Hill 3-0655

BRANCH OFFICES

Chicago 1: 221 N. La Salle St.
J. M. Connors — Tel., Financial 6-3450

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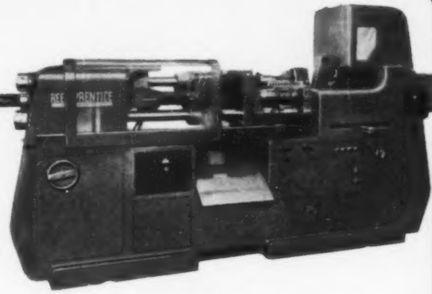
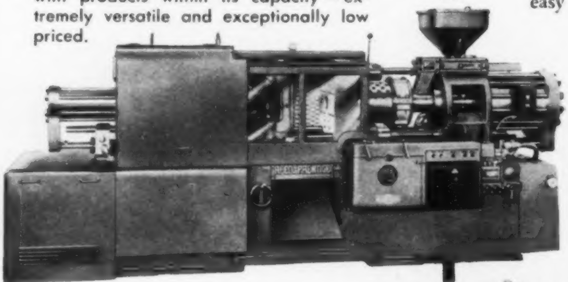
COMPLETE

REED-PRENTICE standing line of Molding Machines 4 to 60 Oz.

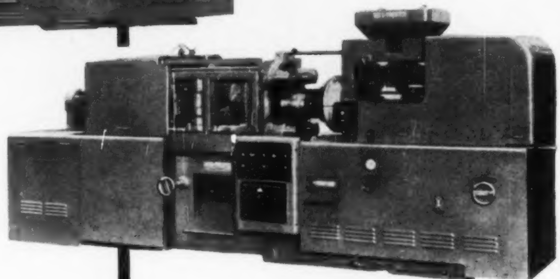


The 5A-4 Oz. model is the answer for injection molders requiring additional production facilities or for manufacturers with products within its capacity — extremely versatile and exceptionally low priced.

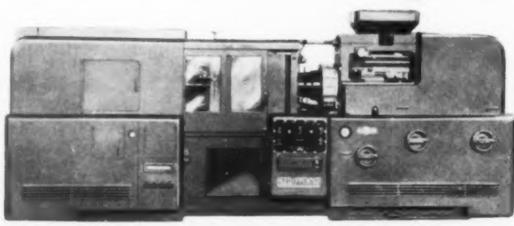
Designed and built for the molding of accurate plastic parts and products . . . Reed-Prentice injection machines can be depended on for continuous, every day production. Simple and safe to operate . . . easy to maintain . . . these machines offer



The 10D-8 and 10 Oz. machines are extremely popular with injection molders because of their medium capacity, dependable operation and adaptability to the production of a wide range of thermoplastic parts and products.



Low in cost for its capacity and performance, the 10D-12 Oz. model has all the important Reed-Prentice injection machine features for steady, un-interrupted production.



The 10E-16 Oz. injection machine is modern in every way . . . from its efficient construction and economical performance right down to its streamlined appearance.

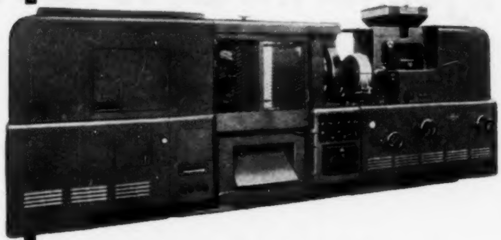
THE WORLD'S LARGEST MANUFACTURERS OF INJECTION MOLDING MACHINES

SPECIFICATIONS	5A-4	10D-8	10D-10	10D-12	10E-16	10H-24	10H-32	10J-60
Die locking pressure, tons	100	250	250	275	300	600	600	1000
Max. casting area, sq. in.	50	100	125	110	120	210	210	350
Mold opens	8″	10¼″	10¼″	10¼″	12″	16″	16″	24″
Max. die space	12″	16″	16″	16″	17″	20″	20″	40″
Size: die plates	16 x 21″	21 x 25″	21 x 25″	21 x 25″	25 x 26″	30 x 30″	30 x 30″	60 x 60″
Oz. molded per shot (acetate)	4	8	10	12	16	24	32	60
Pressure psi on material	16,000	20,000	16,000	20,000	23,000	24,500	24,500	24,500

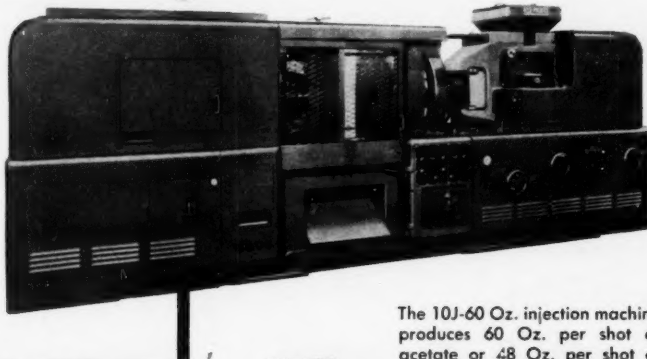
SERVICE...

Offers you an out- Plastic Injection ranging from capacity!

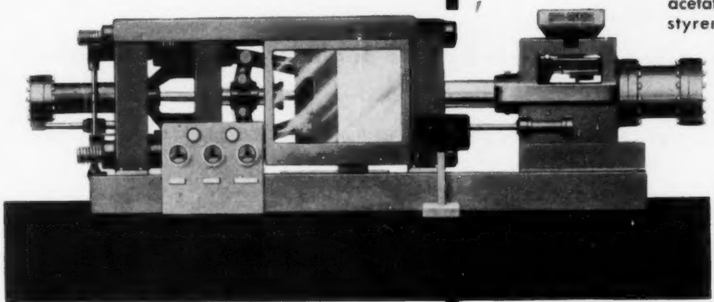
the molder absolute control of the three vital molding variables . . . time, temperature and pressure. Reed-Prentice maintains a complete mold service—from designing, engineering and manufacturing to the actual testing of molds.



The 10H-24 Oz. model is particularly suited for larger molds being used more and more in plastic injection production.



This model—the 10H-32 Oz. injection machine—is capable of large capacity shots of considerable area or for quantity production runs from multiple cavity molds.



The 10J-60 Oz. injection machine produces 60 Oz. per shot of acetate or 48 Oz. per shot of styrene. A maximum of 150 cycles per hour (dependent on product and mold construction) plus larger mold capacity, places the molder in a commanding position in the competitive field.

MAIL TODAY

Mail coupon for your copy of "A Complete Service on Injection Molding"

NEW YORK 6
75 West Street

CLEVELAND 13
1213 W. 3rd Street

LOS ANGELES 11
2314 Santa Fe Ave.

INJECTION MACHINES
REED-PRENTICE CORP.
WORCESTER MASS., U.S.A.

Reed-Prentice Corp.
Dept. D
Worcester, Mass.

Please send me copy of the new descriptive machine circular.

NAME____________________

ADDRESS____________________

____

It's a job for the EXPERTS...not the kids!

when it comes to fighting fires...or molding plastics... that's a job for the experts...

TWITCH—*Certainly plastics make better products and better values—sometimes, maybe most times—BUT—*

MORAL—*Not because they are plastics—but because they combine desired characteristics—*

Not because they are cheap—but because they are economical.

ANSWER—*Apply reason, engineering technique and experience to each new application. That's where we come in.*

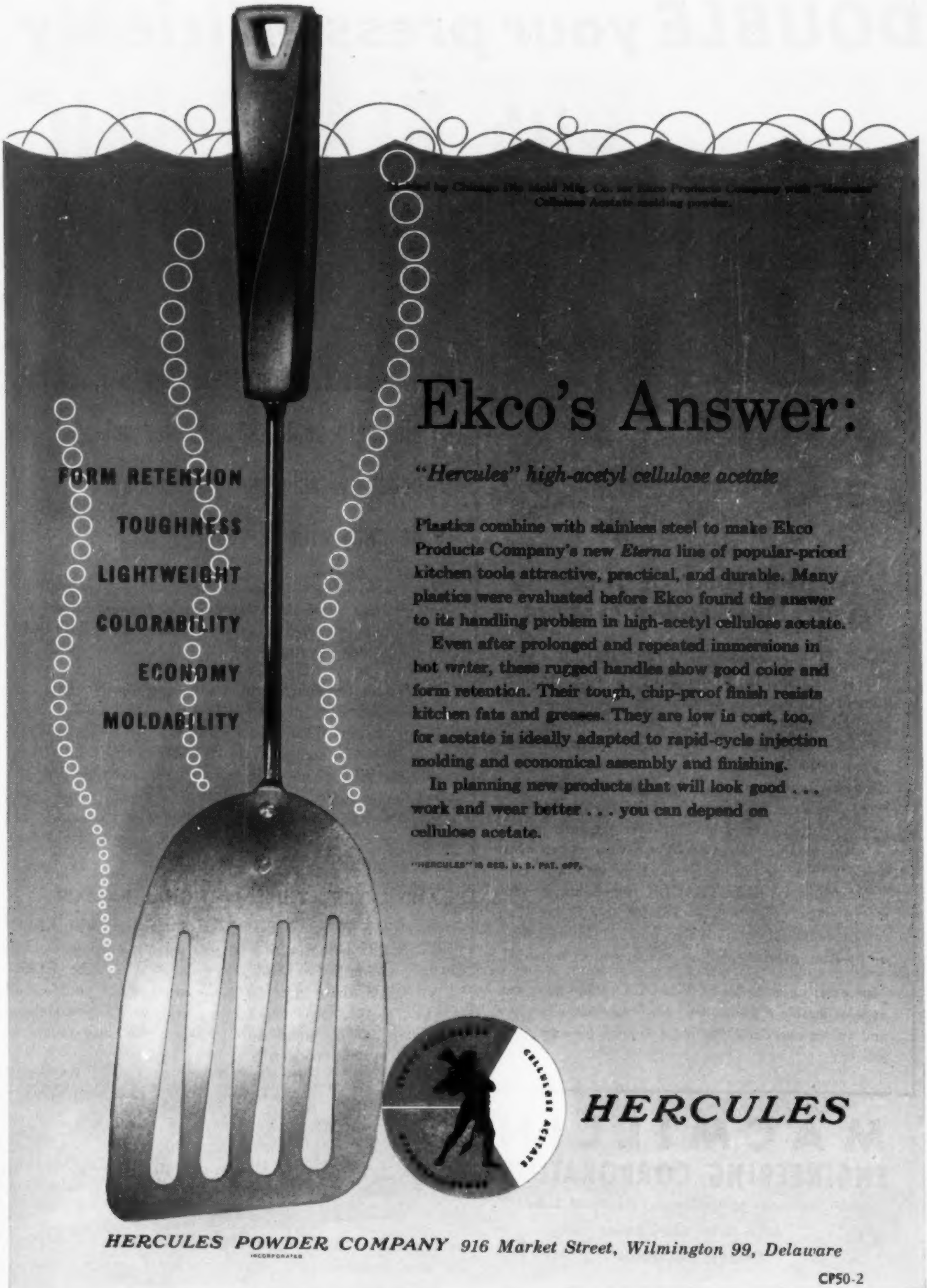
IDEA—*We've been molders for almost thirty years—in one place, the same people.*

We would like to talk over your chances of using molded plastics—the right plastics, in the right place, at the right price.

Boonton

WRITE OR PHONE THE
BOONTON MOLDING COMPANY
BOONTON 3, N. J. BOONTON 8-2020

molders of most plastics by most methods



Ekco's Answer:
"Hercules" high-acetyl cellulose acetate
Plastics combine with stainless steel to make Ekco Products Company's new *Eterna* line of popular-priced kitchen tools attractive, practical, and durable. Many plastics were evaluated before Ekco found the answer to its handling problem in high-acetyl cellulose acetate.
Even after prolonged and repeated immersions in hot water, these rugged handles show good color and form retention. Their tough, chip-proof finish resists kitchen fats and greases. They are low in cost, too, for acetate is ideally adapted to rapid-cycle injection molding and economical assembly and finishing.
In planning new products that will look good . . . work and wear better . . . you can depend on cellulose acetate.
"HERCULES" IS REG. U. S. PAT. OFF.
FORM RETENTION
TOUGHNESS
LIGHTWEIGHT
COLORABILITY
ECONOMY
MOLDABILITY
CELLULOSE ACETATE
HERCULES
HERCULES POWDER COMPANY 916 Market Street, Wilmington 99, Delaware
INCORPORATED
CP50-2

Five years ago *all* refrigerator trays and dishes were made of other materials. Today, plastics have taken over . . . thanks to AMOS *pioneering.*

let AMOS pioneering help You!

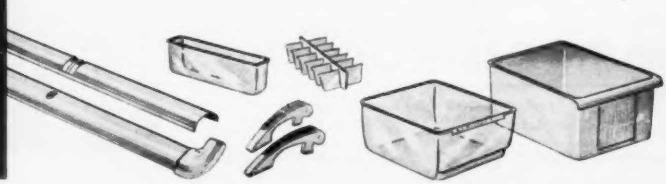
● We take real pride in presenting this *one of many* examples of Amos pioneering—the *original* conversion of refrigerator trays and dishes to plastics. And it was a *real challenge* to Amos engineers working in close co-operation with refrigeration experts . . . because *five years ago* both molders and manufacturers considered it "too difficult" and "not practical."

But Amos said it could be done and, more important, *did it* . . . thus giving its good customer the natural insulating properties, improved appearance and lower cost of plastics . . . and placing him a *step ahead* of his competition.

Are YOU up-to-date in plastics? Why not contact AMOS and *be sure!*

Amos MOLDED PLASTICS...
EDINBURG, INDIANA

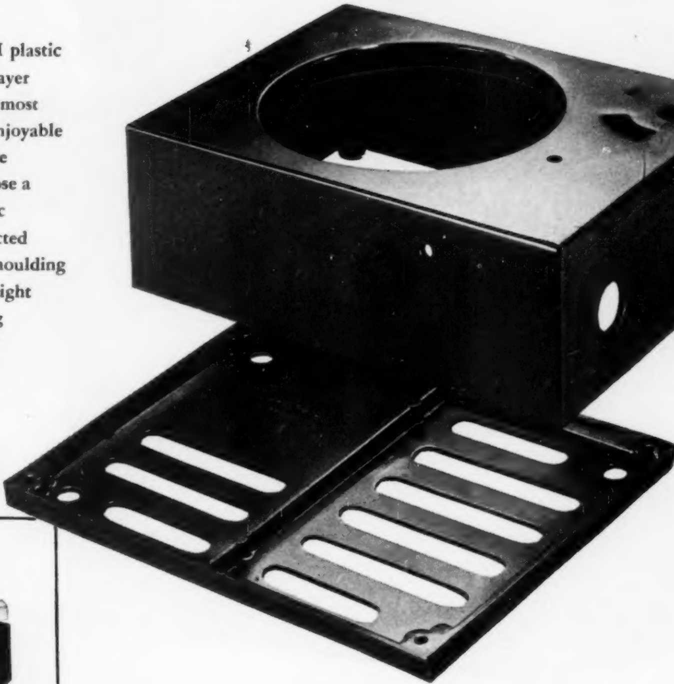
It PAYS to be Up-to-Date in Plastics . . . **Call AMOS Today!**

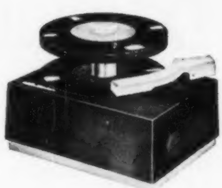


Here's one for the  record—

(RCA Victor's New Vinyl Plastic Record)

Designed for the sensationally successful RCA Victor 45 RPM plastic records, this compact record player provides recorded music at its most convenient, inexpensive and enjoyable best. In combining performance with economy, RCA Victor chose a special maroon phenolic plastic for the cabinet and base—selected Kurz-Kasch for the exacting moulding job. This combination of the right plastic and the right moulding facilities produced the sturdy, attractive unit pictured here.



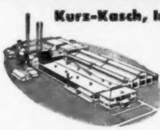


Record Player by RCA Victor
Cabinet and Base by Kurz-Kasch

Here's a shining example of cooperative planning in plastics. RCA Victor and Kurz-Kasch worked together to produce these carefully engineered mouldings on a quantity basis—with the results you see above. In *your* case, good results are just as certain. When you want a complete job—where long runs and delivery schedules are important—we're ready to handle it for you. We've got the staff, the equipment and the reputation necessary to solve your plastics moulding problems. Let one of our engineers tell you more about our facilities.

Kurz-Kasch

FOR OVER 33 YEARS PLANNERS AND MOULDERS IN PLASTICS



Kurz-Kasch, Inc. • 1415 South Broadway • Dayton 1, Ohio

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Philadelphia, *Granite 2-7484* • Dallas, *Lakeside 1022*
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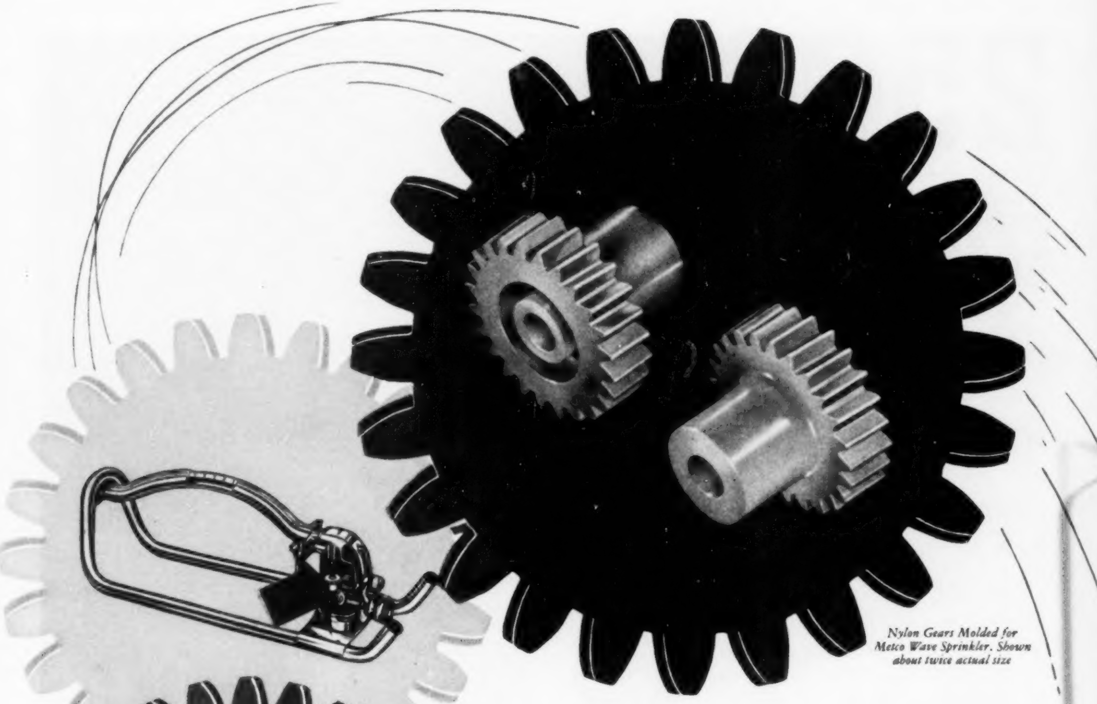
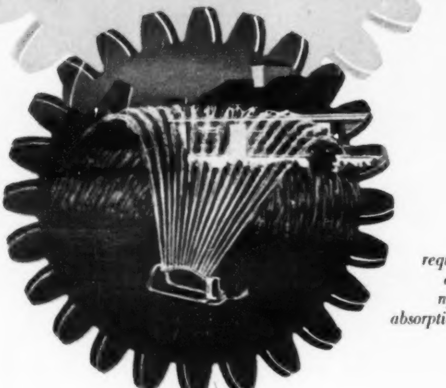


Nylon Gears Molded for Metco Wave Sprinkler. Shown about twice actual size



Skillful Molding

DOES A WELL GEARED JOB

". . . For long life with low wear, a non-metallic gear was a design requirement for the Metco Wave Sprinkler. We chose molded gears for economy and because of the wide range of materials which can be molded. We chose nylon as the molding material because of its high wet strength, low moisture absorption and abrasion resistance when operated with water as the only lubricant."

This excerpt from a letter by Mr. C. K. Wilson, Design Engineer for Metallizing Engineering Company, Long Island City, New York, effectively presents a strong case for molded gears.

If Mr. Wilson had continued in that vein, he might also have said, "We chose Elmer E. Mills Corporation because it is one of the few molders in the country equipped to mold nylon gears."

Why? Because this type of thermoplastic molding presents a challenge few molders care to meet. Since these were undercut "helical" gears instead of the straight "spur" gears, their production presented an unusually difficult job of molding and tool making. Despite the fact that only a few molders can make them, the use of thermoplastic gears is very much on the increase.

Wherever they are used, it is either a case of greater production economy, functional superiority, or both.

So when you are studying the problem of gears for your products, consider the advantages of nylon or other thermoplastic gears. Then let us show how well geared we are to solve this problem for you.

Write on your letterhead for the new Injection Molded and Extruded Plastics Catalog. Or, for detailed information about [redacted] piping, tubing and fittings, write for circulars containing data and illustrations.*

**Trademark Registered*

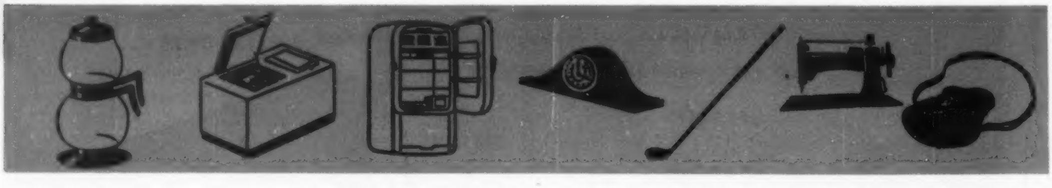
ELMER E. MILLS CORPORATION

INJECTION MOLDERS and EXTRUDERS of: Tenite, Lumarith, Plastacele, Fibestos, Lucite, Nylon, Plexiglas, Polystyrene, Styron, Loalin, Vinylite, Geon, Plexene, Polyethylene, Cerex, Forticel, [redacted]*, Saran, and other Thermoplastic Materials.

2930 NORTH ASHLAND AVENUE • CHICAGO 13, ILLINOIS

What..? No Mousetrap?

From welding helmets to hair dryers . . . from paper towel holders to parts for fire alarm boxes, Prolon Plastics molds all manner of articles for American industry! These are just a few! Ignition parts for automobiles and airplanes. Containers, covers and vent plugs for storage batteries. Parts for toasters, irons, coffee makers and freezer cabinets. For refrigerators, Prolon Plastics supplies baffles, meat and vegetable pans, snack boxes, shelf



fasteners, and many more essentials. Also housings and cases for clocks, cube steak slicers, paper cup dispensers, bathroom scales, sewing machines and binoculars. Cabinets and parts for radios and television sets . . . and parts for telephones, sports equipment and cameras.

PROLON

make it with mpm equipment

That's right, you can produce polyethylene film a full 100″ wide and larger at low cost with MPM extrusion equipment! And you can also extrude polyvinyl chloride film up to 80″ wide and down to .001″ in thickness, as well as wide strips up to .020″ thick.

One of the scores of applications on which mpm extruders are in use

ADVANTAGES OF USING MPM EQUIPMENT

- film can be made thinner than by calendering
- gauge by gauge, extruded film is reported to be stronger by material suppliers' laboratories
- extruded film can be given a superior finish
- extruded film shrinks more evenly in both directions
- existing windups can be used in many cases — special slitting and winding equipment is under development
- no special, expensive foundations or buildings are needed for MPM extrusion units

The lighter gauge films can be used for general packaging applications and for laminating to paper. The heavier films are suitable for upholstery use, and for fabrication into shoes, handbags and the like. Tubing of many sizes, which can be made with MPM extruders, is perfect for packaging items such as candy, food products, ball bearings and small machine parts, etc.

HERE'S THE ECONOMICS

MPM extruders are now in use throughout the world. Consult with your materials suppliers before purchasing equipment. They are best able to advise regarding the processing of their compounds. They can also supply a list of sources for equipment. It would pay you to check *all* for a comparison of construction and to determine which manufacturer is best fitted to supply your needs—especially where production per dollar of investment is important.

SEND FOR DETAILS

modern plastic machinery corp. mpm

15 Union St., Lodi, N. J., U. S. A.
Cable Address: MODPLASEX

The New NASH "103"

AUTOMATIC FLASH LATHE

Is hand flash removal slowing down your production of circular moldings and costing you more money than it should? There's no reason for such a situation.

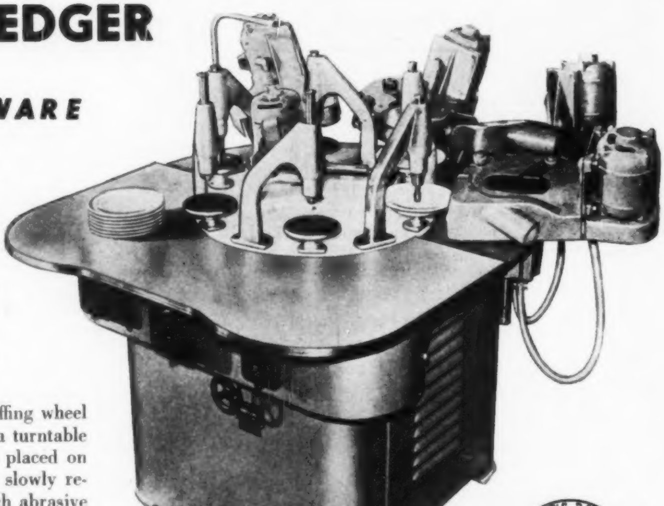
A Nash "103" Automatic Flash Lathe will quickly correct things. How? By turning out 20 to 60 perfectly deflashed circular or cylindrical moldings per minute at minimum cost. Its operation is confined to the flash area exclusively, assuring that the surface appearance of molded piece is maintained.

The "103" Flash Lathe has 10 spindles and can deflash moldings up to 4½" diameter when all spindles are used and up to 6" in diameter when alternate spindles are employed. What's more, all necessary adjustments of spindle speeds and heights are easily made. Height adjustments vary from nothing to 8".

116 ROTARY EDGER

FOR

PLASTIC DINNERWARE



The Nash 116 Rotary Edger perfectly finishes 8 to 24 pieces per minute. It handles plastic dinnerware and other circular moldings from 3" to 11" in diameter. The proper combination of spindle speed and turntable speed (both easily adjustable) is determined by the amount of flash removal desired. The position at which you set the universally mounted abrasive belts permits accurate control of the finished diameter.

Four high-speed abrasive belts plus a buffing wheel do the work. They are mounted around a turntable containing six sets of spindles. Moldings placed on the spindles rotate and, as the turntable slowly revolves, are brought into contact with each abrasive belt in turn. The belts have progressively finer abrasives. The last belt is wax-impregnated to blend the flash scars, and the buffing wheel imparts a final polish.

IF IT'S ROUND NASH CAN SAND IT

J. M. NASH COMPANY

2370 No. 30th St. Milwaukee 10, Wis.

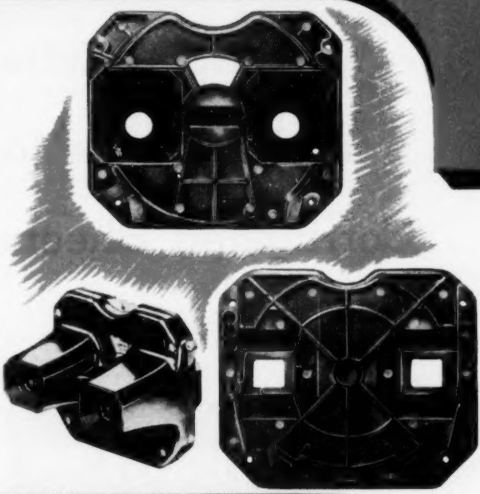
ASK STOKES

3 Dimensions of Automatic Molding . . . Speed, Low Cost, Perfect Product

THIS precision optical instrument for viewing color transparencies in three dimensions is light, compact, durable. Dimensional stability that maintains rigid optical alignment throughout the instrument's life is a characteristic of this plastic molded product.

It is the "VIEW-MASTER", a stereoscope consisting of two plastic components produced on Stokes automatic molding presses by Sawyer's, Inc., Portland, Oregon.

Sawyer's Inc., has a battery of seven 50-ton Stokes completely automatic molding presses . . . and a well-organized, high speed assembly line keeps up with production from the molding department.



Fully automatic molding is reliable, foolproof, flexible and economical . . . production costs are reduced and products improved. The Stokes Advisory Service will tell you if your plastics parts can be automatically molded . . . just send parts or blueprints for analysis, without obligation.

F. J. STOKES MACHINE CO.
5934 TABOR ROAD
PHILADELPHIA 20, PA.

FJS

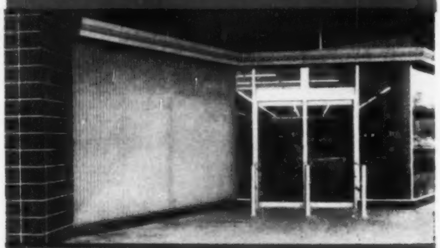
Stokes makes Semi-Automatic and Automatic Molding Presses, Plunger Presses, Closure Presses, Preforming Presses, Industrial Tabletting and Powder Metal Presses, Vacuum and Special Processing Equipment, Water Stills and Special Machinery.

STOKES KNOWS HOW

in practically every industry . . .

In boat building . . . It takes 6 men only 6 hours to mold the one-piece hull for this 18-foot Navy personnel boat. Fiberglas reinforcements were used.

For sporting goods . . . Fiberglas reinforcements provide this fishing rod with all the strength, flexibility and weather resisting properties the sportsman wants.



In the building industry . . . Translucent corrugated panels, with Fiberglas reinforcements, are decorative as well as structurally efficient. Their shatter-resistance and weathering properties increase their applications in all types of buildings.

from Hulls and Helmets to Corrugated Sheets and Casting Rods...

it's OWENS-CORNING FIBERGLAS for plastics reinforcement

Plastics with Fiberglas* reinforcements is the new *buy-word* for producing sturdy, durable, sales appealing merchandise. No longer in the drawing board stage, plastic products made with Fiberglas reinforcements are now being used profitably in practically every industry.

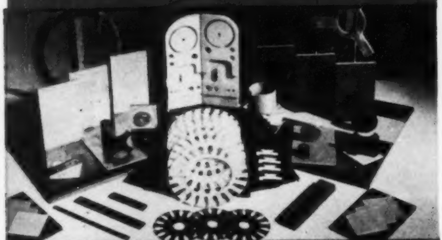
You will find plastic products, incorporating Fiberglas reinforcements, in the most minute electrical parts; in strong, flexible fishing rods; in rugged aircraft structural parts, in sleek motor boat hulls; in colorful, attractive corrugated building panels; in sanitary materials-handling trays and in a score of other colorful, easily fabricated products, immune to corrosion and rust. Many of them are now being sold and many more in the process of development.

With Fiberglas reinforcements you can get these *plus values* that make for better-selling plastic laminates:

- Exceptionally tough
- Light in weight
- Highly resistant to weathering
- Dimensionally stable

. . . and practically all products

For materials handling . . . Delivery boxes containing Fiberglas reinforcements are being used by leading bakers throughout the country. They resist chipping, denting, and distortion, increase payloads and can be easily cleaned and sterilized.



For electrical insulations . . . Plastics reinforced with Fiberglas materials for electrical applications are produced in a wide variety of types and forms, such as laminates, tubes, molded parts, etc. Their strength, moisture resistance, temperature resistance and good electrical properties have lead to their specification for many tough jobs.

For home appliances . . . In their line of home appliances, Apex Electrical Manufacturing Company uses Fiberglas strands for reinforcing such important plastic parts as clotheswasher tub liners, balancing rings and dishwasher tubs.

HERE ARE THE FIBERGLAS REINFORCEMENTS THAT WILL HELP YOU MANUFACTURE SALES-APPEALING PLASTIC LAMINATES

- **FIBERGLAS CHOPPED STRAND MAT**
  For matched die molding of formed parts.
  For low-pressure flat sheets.
  For decorative flat and corrugated sheets.
  For lamination with polystyrene.
- **FIBERGLAS CHOPPED STRANDS No. 38 AND CUT FILAMENT No. 38**
  For use in the preform process in the production of high-volume reinforced polyester parts—glass reinforcement at its lowest cost.
- **FIBERGLAS SURFACING MAT**
  For improved surface smoothness and greater uniformity of color on laminates reinforced with other Fiberglas products.
- **FIBERGLAS MILLED FIBERS**
  For reinforcement, stability and higher temperature resistance in compression moldings and castings.
- **FIBERGLAS YARNS**
  For maximum unidirectional strengths in fishing rods, piping and rod stock.
- **CLOTHS WOVEN OF FIBERGLAS YARNS**
  For flat sheets, high and low-pressure formed parts where highest strengths and lightest weights are required.

OWENS-CORNING
FIBERGLAS

Plastics Reinforcement

To learn more about the properties and applications of Fiberglas plastics-reinforcement materials, write for a copy of "Fiberglas Products for Reinforced Plastics" Manual PR.6C1 . . . Owens-Corning Fiberglas Corporation, Department 125-A, Toledo 1, Ohio.

*FIBERGLAS is the trade-mark (Reg. U. S. Pat. Off.) of Owens-Corning Fiberglas Corporation for a variety of products made of or with glass fibers.

OWENS-CORNING FIBERGLAS CORPORATION
Department 125-A, Toledo 1, Ohio

Please send me a copy of "Fiberglas Products for Reinforced Plastics" Manual PR-6C1.

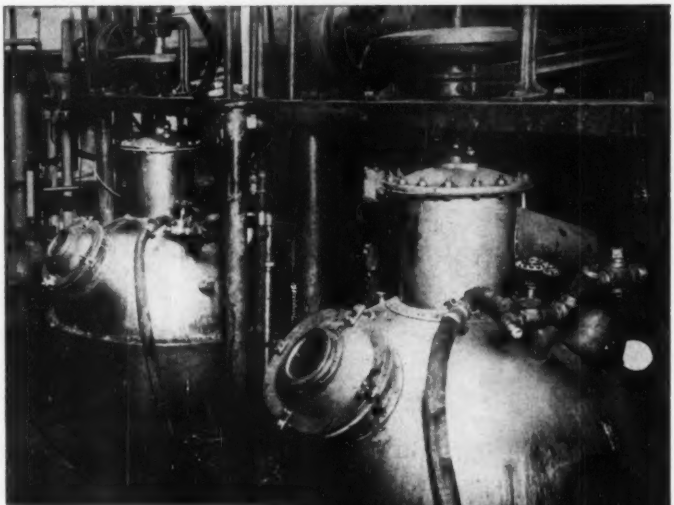
Name...

Address..

City...................*Zone*......*State*..........

Let Pure Nickel

PROTECT YOUR PHENOL-FORMALDEHYDE PLASTICS



Here's why pure Nickel has been standard ever since clear, transparent plastics and resins were first produced:

Nickel's high degree of corrosion resistance keeps metal pick-up down; it assures purity, uniformity and color protection during all stages of production, handling, transportation and storage.

Nickel has good heat transfer properties, too. It finds wide application in the production of high purity phenol—stills, condensers, and reactors operating at high temperatures and pressures.

Temperatures in storage tanks, naturally, are not so high—*but contact may be for long periods.* Corrosion which might not damage the equipment itself to any great extent is undesirable because it means product contamination. It is here that Nickel storage tanks — as well as Lukens Nickel-Clad Steel tanks and tank cars — are exceptionally valuable.

At one large plastics plant, for example, analysis of a representative phenol sample after 28-day storage in a 10,000-gallon Nickel-Clad tank, showed a Nickel content of only 0.21 parts per million!

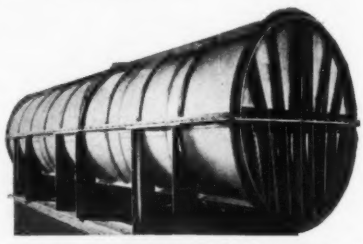
Nickel can improve your product, too

If corrosion dims the sparkle and lustre of your finished product, turn to Nickel. It has countless applications in the processing of phenolics.

Standardize on this strong, corrosion-resistant metal for your holding and mixing tanks, pipe lines and pumps . . . for kettles, escape lines, condensers and storage tanks.

With Nickel on the job, you can be *sure* of protection against metallic contamination.

JACKETED NICKEL PROCESSING KETTLES for phenolic plastics. Nickel not only resists corrosion by phenol, but also by formaldehyde and the mixtures encountered before and during processing operations.



TYPICAL PHENOL STORAGE TANK built of light-gauge Nickel sheet, reinforced with steel. Analysis of phenol after a month's storage showed only 0.21 parts per million of Nickel. *Photo courtesy Whitlock Mfg. Co., Hartford, Conn.*

THE INTERNATIONAL NICKEL COMPANY, INC.
67 Wall Street, New York 5, N. Y.

Standardize on PURE NICKEL . . . where PURITY counts

informative labeling in action...

THE LADY IS CONFUSED. Many plastic-buyers are, for they know that look-alike plastics often have different characteristics.

AHHH, her eye is attracted by the labels on the soap dish telling her its 6 useful advantages and informing her it is 'made of Styron.'

THIS IS THE TYPE of informative labeling that is helping clinch sales for *Lustro-Ware* products in thousands of retail outlets.

HERE IS AN EXCELLENT EXAMPLE of informative labeling and on-the-counter salesmanship *in action*, from Columbus Plastics of Columbus, Ohio.

With Mrs. America as its sales target, Columbus Plastics uses Kum-Kleen pressure-sensitive Informative Labels to tie in with the famous *Styron* name and to tell her the advantages of *Lustro-Ware* products.

Here is why Columbus Plastics found these pressure-sensitive labels the answer to informative labeling: KUM-KLEEN Labels are applied with production-line speed at a fraction of the on-the-product cost of ordinary labels. They stick and stay stuck to all plastics, without heat or moistening... yet are easily removable without harmful scraping or tearing.

Columbus Plastics is just one of many manufacturers who have found they can at last give their products the advantages of KUM-KLEEN informative labeling at a remarkably low on-the-product cost.

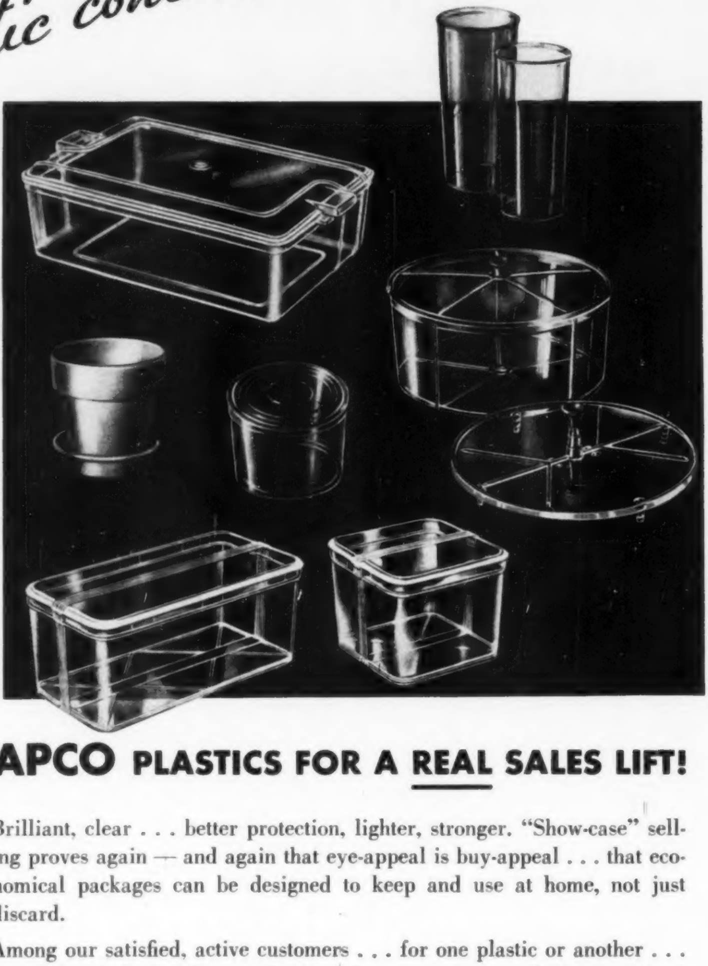
When you think of informative labeling in action, think of Kum-Kleen. Write today for Kum-Kleen facts and samples.

Kum-Kleen®

AVERY ADHESIVE LABEL CORPORATION
Monrovia, California

NEW YORK · PHILADELPHIA · DETROIT · CHICAGO · CLEVELAND · AND ALL PRINCIPAL CITIES

How beautiful can a plastic container BE?



..try APCO Re-Use Containers and SEE!

. . . COUNT ON APCO PLASTICS FOR A REAL SALES LIFT!

these new, clear-vue containers add extra buy-incentive — and can be used hundreds of ways after the first packaging job is completed.

NOW IN STOCK:
Square Boxes, 6 sizes, Round Boxes, 2 sizes, "Cake" and "Cheese" covers, Flower Pots, 3 sizes.

Beautiful with YOUR Mdse. . .
Useful in your consumers' homes.

48 OUNCE PRESS
Largest of our 12 injection molding machines is now ready to serve you.

Brilliant, clear . . . better protection, lighter, stronger. "Show-case" selling proves again — and again that eye-appeal is buy-appeal . . . that economical packages can be designed to keep and use at home, not just discard.

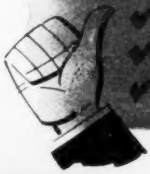
Among our satisfied, active customers . . . for one plastic or another . . . are 75% of the 400 largest firms in the country — proof of a consistent record as efficient, economical producers of injection, extrusion, and compression moldings of finest quality. With modern, highly-equipped plants, plus an outstanding research and engineering staff, you can count on us for advice and solution of your packaging problem — from rough sketches to final custom-molded plastic package. Consult us freely on your "presentation problem."

Associated Plastic Co's are the only licensed molders of RUZAKWARE

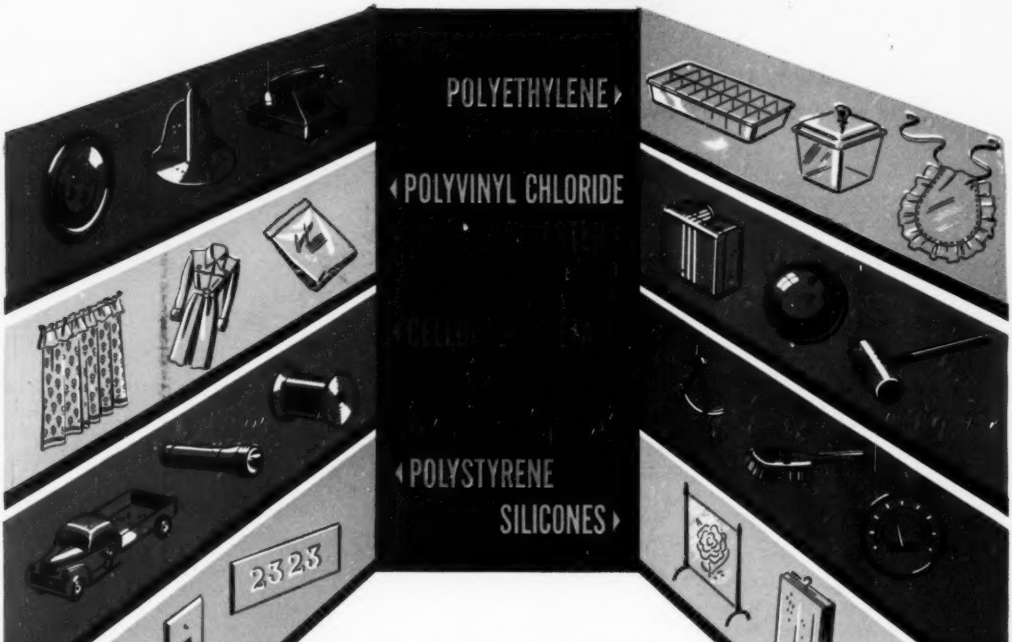
ASSOCIATED PLASTIC COMPANIES, INC. General Offices, 1198 Merchandise Mart, Chicago 54, Ill.

THEY *ALL* AGREE! . . .

***Ferro pigments* are highly stable, heat and light-fast ...produce permanent colors**



- MANUFACTURERS OF PLASTIC MATERIALS
- EXTRUDERS
- CALENDERERS
- COATERS
- FABRICATORS
- MOLDERS



Ferro's inorganic colors are acclaimed by the entire plastics industry, *as having the greatest combination of desired coloring properties!* Highly stable, particularly in temperatures up to 2300° F, *Ferro pigments* are easy to work and have an unusually low bulking value. Electrical and chemical-resistant, these uniform colors are light-fast . . . are not affected by weather extremes . . . are nonbleeding and nonmigrating. If you are not satisfied with your present colors we suggest that you try *Ferro pigments* in your formulations. You'll find we have a wide range of colors that diffuse smoothly with a uniform intensity on which you can depend. Drop us a note, we'll be happy to send you whatever additional information you might require regarding our color service, or a representative will call at your request.

FERRO Enamel Corporation Color Division

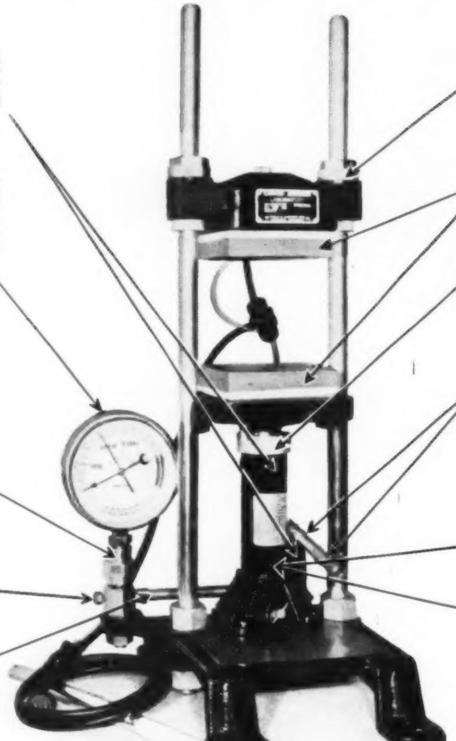
4150 East 56th St., Cleveland 5, Ohio

LATEST EDITION of

THE CARVER LABORATORY PRESS

Standard for Plastics Research, Development and Control for More than Twenty Years .....

TWELVE NEW FEATURES are introduced in the latest edition of the world-renowned Carver Laboratory Press.



1. *NEW, PLASTIC IMPREGNATED PACKINGS* on patented pump plunger and main ram—For better fit and longer life.

2. *LARGE, ACCURATE 6" BRASS CASE SHOCK-RESISTING PRESSURE GAUGE*—traditionally finest obtainable, provided with shock absorbing slotted link to protect movement.

3. *NEW, QUICK-ACTING POSITIVE UNION GAUGE COUPLING*—For quick, easy interchangeability and alignment of gauges. (Change gauges in a jiffy.)

4. *AUXILIARY PRESSURE CONNECTION*—For supplementary use as a source of hydraulic pressure to 16,000 pounds.

5. *POROUS METAL PRESSURE SNUBBER*—To protect gauge tube from shock.

6. *NEW, KNURLED AND HEXAGON HAND-RUNNING COLUMN NUTS*—For quick, easy head adjustment.

7. *HARD ALUMINUM ALLOY HOT PLATES*—For quicker heating and cooling.

8. *DUST CAP AND OIL SEAL ON CYLINDER CASING*—For protecting unit from troublesome dust and dirt particles.

9. *HEAVIER PUMP LINK AND PINS*—For longer wear.

10. *LENGTHENED PUMP LEVER*—For easier pumping, especially at low pressures.

11. *INTERNAL OIL STRAINER*—For dirt-free operation.

12. *LARGER OIL PASSAGES AND VALVES*—For non-clogging operation.

Write for bulletin describing Press and standard interchangeable accessories.

FRED S. CARVER INC.
HYDRAULIC EQUIPMENT
343 HUDSON ST. NEW YORK 14, N. Y.

Newest development in plastic upholstery —

Resproid IRIDESCENT

another example of Respro research to give you better plastics

This is the loveliest, newest covering for bedroom furniture you've seen yet — Respro's beautiful *Iridescent* upholstery material.

Loveliest... because a million tiny jewels seem to shine from its silvery, iridescent colors.

Newest... because this outstanding color effect in upholstery material has just been perfected after months of laboratory experiment.

Whether you are in the furniture business or not, you will be interested in *Resproid Iridescent*. Because the same Respro research that produced it is continually trying to make better looking, better wearing, better selling plastics for hundreds of end uses.

For almost everything from calf-grain handbags to baby pants, shower curtains to raincoats, aprons to upholstery, there is a type and style of *Resproid* that will add new beauty, new sales appeal to your lines.

If you manufacture furniture, write for samples of new *Resproid Iridescent*. If you manufacture anything in which plastic film or sheeting can play a part, write Respro for the latest developments in your field now.

Guaranteed by Good Housekeeping

Respro INC.
CRANSTON 10, RHODE ISLAND

PAULITE the plastic that's BRIGHT at NIGHT

For the premier in luminescent plastics

use
PAULITE PHOSPHORESCENT POLYSTYRENE

PAULITE PHOSPHORESCENT POLYETHYLENE

PAULITE PHOSPHORESCENT TENITE II*

PAULITE PHOSPHORESCENT POLYVINYL

PAULITE PHOSPHORESCENT GEON*

---

also
PAULITE FLUORESCENT POLYSTYRENE
(for use with black light)

LONG LASTING LUMINESCENCE

Articles made of PAULITE emit a warm, friendly glow in the darkness. This after-glow lasts for as many as 10 or more hours, depending upon the intensity of activation.

EASY TO USE

Luminescent PAULITE comes in 1/8" to 1/4" granules — ready for immediate molding. You handle PAULITE just as you would any other thermoplastic molding compound—it requires no special treatment before, during or after molding. All ingredients are thoroughly sealed, finished pieces have a glossy surface.

For complete information about the various varieties of PAULITE and how they can increase the saleability of your products write.

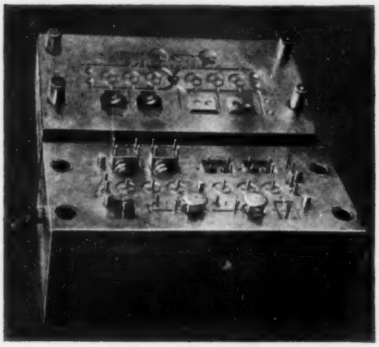
*Reg. U. S. Pat. Off.

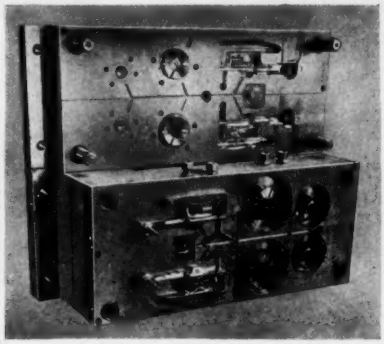
THE PREMIERE IN LUMINESCENT PLASTICS
PAULITE
REG. U. S. PAT. OFF.

LUMINESCENT PLASTICS CORP.

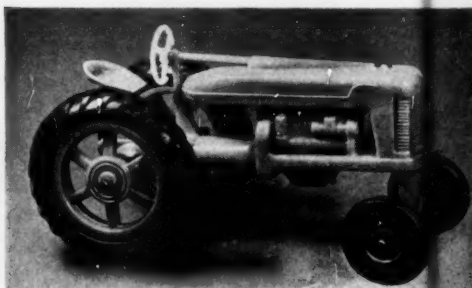
201 NORTH WELLS STREET • CHICAGO 6, ILLINOIS

WINDSOR-made molds like these





produce PRECISION-DETAILED MOLDINGS LIKE THESE



Whether the mold in question is for a scale model toy, or for an intricate component of a vital piece of machinery, the painstaking skill and precision workmanship which Windsor craftsmen put into its construction is identical.

Windsor-made molds for thermoplastics take full advantage of the capabilities of your molding machine and the material you will use. They're accurately machined to the tolerance required. They're polished to perfection to insure moldings with flaw-free surfaces. What's more, Windsor's vast experience with molds of all sizes for every plastic material frequently suggests design alterations which result in greater molding economy, easier assembly, stronger, more serviceable finished pieces.

As one of the world's largest producers of fine injection molding machinery, Windsor is equipped in every respect to produce your molds with the utmost efficiency and precision. Sketches, models, blueprints or plans, together with complete details should be sent to facilitate estimates. *Write without delay.*

R. H. Windsor, Ltd., is the exclusive manufacturer of the world-famous L.M.P. double screw compounder-extruder for the British Empire, the United States and South America (Brazil excluded).

R. H. Windsor Ltd.

16 Finsbury Square, London, E. C. 2, England

Cables: TECHNIMACH, LONDON

How to save *most* in assembly

Eliminates Fracture, Stripped Threads, Tap Breakage. *Moldmaster Inc. chose P-K Type F-Z Screws to attach the Durez plastic panels to the sheet metal frame of this smart file cabinet. Extra fastening time, panel fracture and tap breakage would have made cost of this assembly prohibitive by any other method. Find out how you can make similar savings.*

Choose the "*short cut*" fastening method

When you make fastenings with Self-tapping Screws, you simply drive them in plain, untapped holes. You avoid tapping for machine screws, inserts in plastics and other assembly-slowing operations like nut-running and riveting. Stripped threads, tap breakage, and parts spoilage are no longer a problem, and your assembly is stronger. But choosing this common sense *method* is only the first step.

Let P-K* fit the fastener to the job

There are many types of Self-tapping Screws. Only Parker-Kalon makes *all* types. P-K fits the right fastener to your needs, not your needs to a fastener. Another reason why P-K can help you save most is their 35 year experience as Self-tapping Screw specialists. P-K applications number more than a million, many with savings up to 50% and over.

Find out what you can save. Call in a P-K Assembly Engineer, or send assembly details for recommendation. Complete details in booklet on request. Parker-Kalon Corporation, 200 Varick Street, New York 14, N. Y.

*Trade Marks Reg. U. S. Pat. Off.

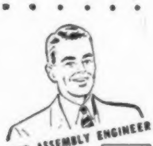
P-K TRADE MARK

The Original

PARKER-KALON* SELF-TAPPING SCREWS

A TYPE AND SIZE FOR EVERY METAL AND PLASTIC ASSEMBLY

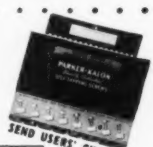
HOW PARKER-KALON HELPS YOU PLAN FASTENING ECONOMY



SEND ASSEMBLY ENGINEER ☐

A P-K ASSEMBLY ENGINEER will study your fastening problems, make P-K laboratory tests when required, prepare a complete report on possible savings. No obligation.

P-K SELF-TAPPING SCREW "USERS' GUIDE" describes all types. Includes handy selector chart—recommended hole sizes—stock sizes—other engineering data. Free on request.



SEND USERS' GUIDE ☐

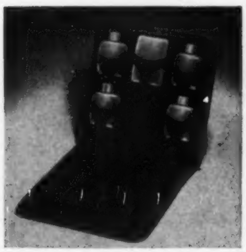
Check either or both, tear off on dotted line, attach to your letterhead and mail to PARKER-KALON, 200 Varick Street, New York 14.

NEWS ABOUT NEW IDEAS

TUSSY'S WIND AND WEATHER lotion comes in an appealing Plaxpak polyethylene bottle shaped like a snowman and "dressed" in a black hat, black buttons and red woolen scarf. Unbreakability of bottle makes it convenient to use and carry anywhere.

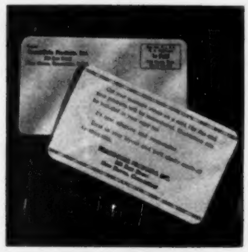
HEWITT EMPHASIZES RE-USE value of Plaxpak polyethylene bath salts bag fabricated by Kellogg Container Division, U. S. Envelope Co. Soft to the touch, the Plaxpak bag is tough and durable — a smart package in every way, full of sales appeal.

PLAX POLYETHYLENE PROVIDES a tough, flexible and low cost carrying strap for Emerson radio. The strap will take constant twisting and is impervious to perspiration. Its flexibility will not be affected by temperature changes. Strap is black.



NEW SIMMONS BATH KIT features four empty, tapered-square Plaxpak polyethylene bottles. Milady can fill them with her favorite toiletries and use them without fear of breakage either at home or while traveling. Lightness of bottles is big help, too.

COMPLETELY SEALED, AIR-TIGHT and dust-tight, this Polyflex* salesman's sample display box gives desired rigidity, optical clarity, and eye appeal. Designed by Life Savers Corp. Fabricated by National Fabrilite Corp. New Haven. Polyflex* is low in cost.



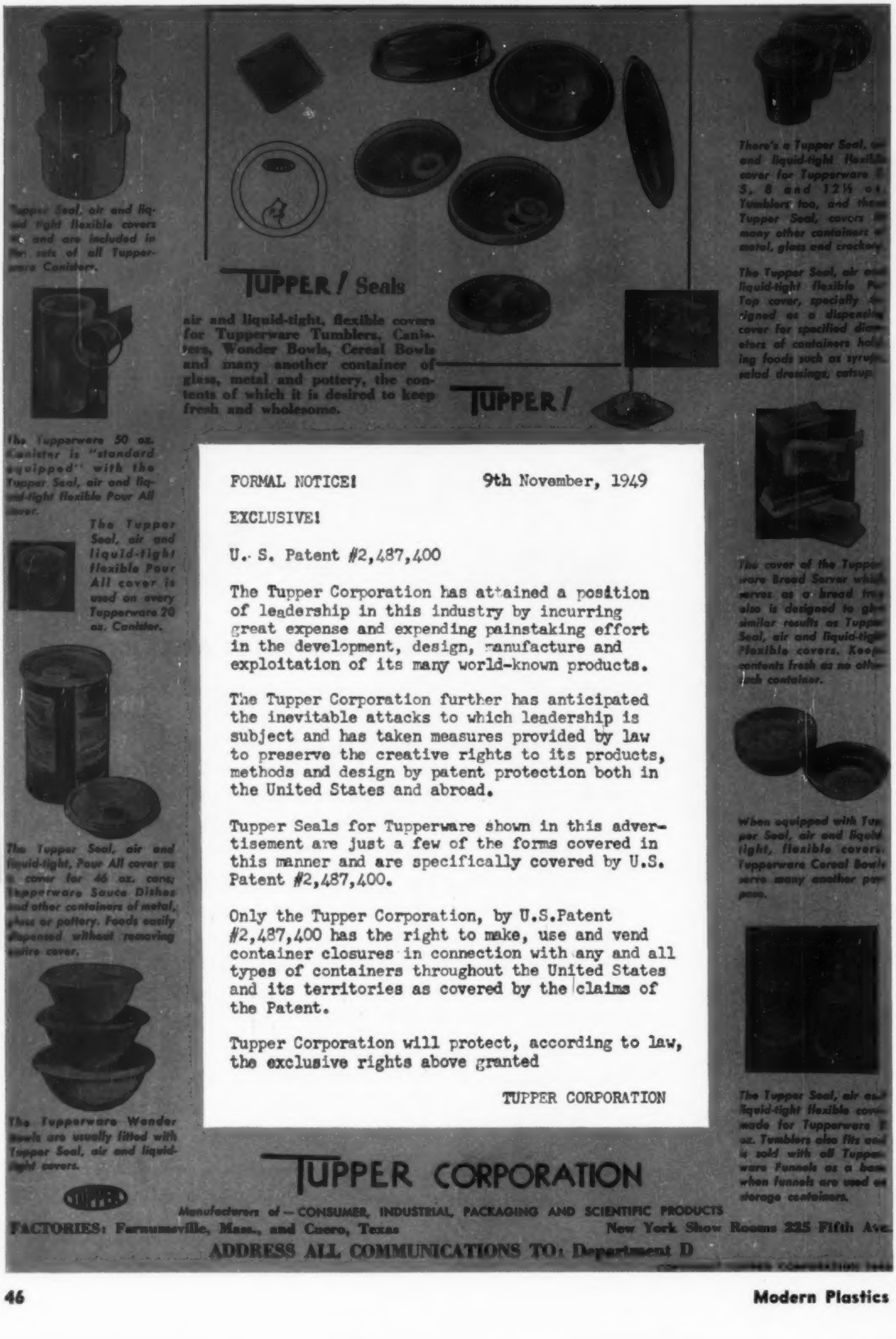
ATTENTION-GETTING post cards of Polyflex*, polystyrene given a two-way stretch for greater strength, are made by Practi-Cole Products, Inc., New Haven. Approved by the Post Office, the cards are addressed by pasting on typewritten paper slips.

These new applications of Plax products demonstrate the use of plastics as improvements — not substitutes. To any user of thermoplastics, Plax offers a wide selection of materials in a wide variety of forms — plus expert and objective guidance on their application.

On problems involving thermoplastics, see Plax. Plax can help you select the right plastic and, where desired, assist on merchandising.

PLAX BLOW-MOLDED PRODUCTS ARE MADE UNDER THE FOLLOWING U.S. PATENTS: 2128239, 2175053, 2175054, 2230188, 2230190, 2260750, 2283751, 2349176, 2349177, 2349178. *TRADE MARK REG. U.S. PATENT OFFICE.

PLAX CORPORATION DIVISION, HARTFORD-EMPIRE COMPANY
P. O. BOX 1019, HARTFORD 1, CONNECTICUT
In Canada, Canadian Industries, Ltd., Montreal
Offices in New York City, Syracuse, Philadelphia, Chicago and St. Louis



Seal, air and liq- tight flexible covers and are included in sets of all Tupper- Canisters.
TUPPER / Seals
air and liquid-tight, flexible covers for Tupperware Tumblers, Canis- ters, Wonder Bowls, Cereal Bowls and many another container of glass, metal and pottery, the con- tents of which it is desired to keep fresh and wholesome.
TUPPER /
There's a Tupper Seal, and liquid-tight flexi cover for Tupperware 5, 8 and 12½ o Tumblers too, and the Tupper Seal, covers many other containers metal, glass and crockery.
The Tupper Seal, air liquid-tight flexible Top cover, specially signed as a dispensi cover for specified dia eters of containers hol ing foods such as syrup salad dressings, catsup.
The Tupperware 50 oz. Canister is "standard equipped" with the Tupper Seal, air and liq- tight flexible Pour All cover.
The Tupper Seal, air and liquid-tight flexible Pour All cover is used on every Tupperware 20 oz. Canister.
FORMAL NOTICE! 9th November, 1949
EXCLUSIVE!
U. S. Patent #2,487,400
The Tupper Corporation has attained a position of leadership in this industry by incurring great expense and expending painstaking effort in the development, design, manufacture and exploitation of its many world-known products.
The Tupper Corporation further has anticipated the inevitable attacks to which leadership is subject and has taken measures provided by law to preserve the creative rights to its products, methods and design by patent protection both in the United States and abroad.
Tupper Seals for Tupperware shown in this adver- tisement are just a few of the forms covered in this manner and are specifically covered by U.S. Patent #2,487,400.
Only the Tupper Corporation, by U.S.Patent #2,487,400 has the right to make, use and vend container closures in connection with any and all types of containers throughout the United States and its territories as covered by the claims of the Patent.
Tupper Corporation will protect, according to law, the exclusive rights above granted
TUPPER CORPORATION
The cover of the Tupp ware Bread Server wh serves as a bread also is designed to g similar results as Tupp Seal, air and liquid-tig flexible covers. Kee contents fresh as no oth such container.
The Tupper Seal, air and liquid-tight, Pour All cover as cover for 46 oz. cans; Tupperware Sauce Dishes other containers of metal, or pottery. Foods easily dispensed without removing cover.
When equipped with Tu per Seal, air and liqu tight, flexible covers Tupperware Cereal Bowls serve many another pose.
The Tupperware Wonder are usually fitted with Tupper Seal, air and liquid- covers.
The Tupper Seal, air liquid-tight flexible cov made for Tupperware oz. Tumblers also fits and is sold with all Tuppe ware Funnels as a ba when funnels are used storage containers.
TUPPER CORPORATION
Manufacturers of — CONSUMER, INDUSTRIAL, PACKAGING AND SCIENTIFIC PRODUCTS
FACTORIES: Farnumsville, Mass., and Cuero, Texas
New York Show Rooms 225 Fifth Ave.
ADDRESS ALL COMMUNICATIONS TO: Department D

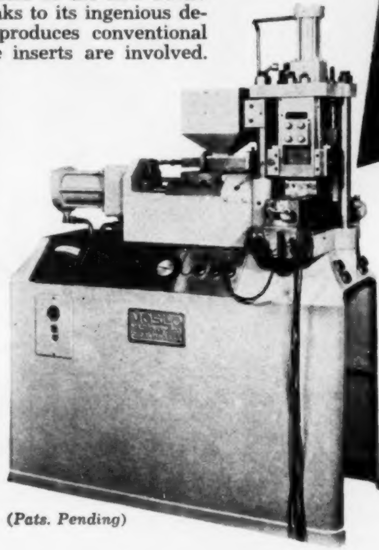
Molding with Inserts?

...then meet the MOSLO DUPLIMATIC MINIJECTOR

Revolutionary design — no downtime while setting inserts

Downtime while setting inserts for injection molded pieces is a thing of the past to users of the new Moslo DUPLIMATIC "Minijector." Thanks to its ingenious design, it far outperforms and outproduces conventional molding machines on jobs where inserts are involved. The secret lies in a shifting twin mold block—while inserts are being placed in one set of the cavities, the other set is being automatically injected. Pressure on two separated buttons completes a cycle, raises the top half of the mold, shifts the cavity block and starts a new cycle. The finished pieces are ejected either automatically or manually and fresh inserts are placed in the empty section of the twin mold block.

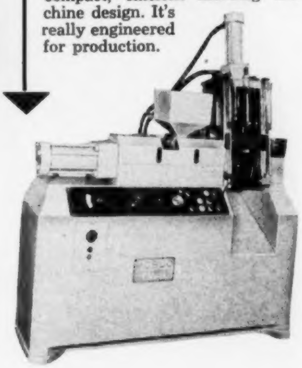
The advantage of this remarkable unit is immediately apparent—it increases production of injection molded pieces which contain inserts and frequently doubles or triples the production of a single mold machine. And what's more, the DUPLIMATIC "Minijector" is very inexpensive to run and only ONE operator is needed.



(Pats. Pending)

MOSLO UNIVERSAL MINIJECTOR

all-hydraulic 2 ounce injection molding machine. The smooth, fast way the Moslo Universal Minijector molds all thermoplastics will give you many more perfect shots per hour at amazingly low operating cost. It provides top-notch, big machine performance and is the latest word in compact, efficient molding machine design. It's really engineered for production.



THESE FEATURES ARE COMMON TO BOTH MACHINES

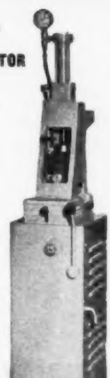
- Injection Capacity — 2 oz. per shot
- Manual or Completely Automatic Operation
- Stainless Steel Torpedoless Cylinder (pats. pending)
- Maximum Injection Pressure — 16250 lbs. per square inch
- Plasticizing Capacity — 25 pounds
- Mold Casting Area — (Duplimatic) 20 square inches
  (Universal) 30 square inches
- Push Button Controls
- Universal mold-clamp assembly — operates vertical or horizontal (Universal only)

for small scale production

¾ OUNCE HYDRAULIC MINIJECTOR

¾ OUNCE HAND OPERATED MINIJECTOR

Small custom moldings, color chips, samples, tensile and compression bars are economically produced on these low-cost MINIJECTORS. They feature demountable, interchangeable cylinder and heater units which permit change of materials and colors in only *three* minutes. Write for details.

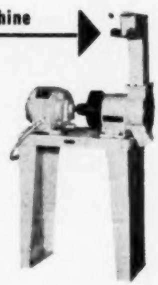


Efficient, Low-Cost Plastic Granulating Machine

The powerful, clean operating Moslo No. 60 Plastic Granulator is priced so reasonably that you'll be able to put one next to each of your molding or extruding machines. It granulates all thermoplastics and delivers maximum cutting efficiency at rated capacity—60 pounds per hour (styrene).

Cutting blades are adjustable and removable for sharpening. Easily cleaned. Sealed ball bearings.

Immediate inquiries invited to insure early delivery.



MOSLO machinery company
2443 Prospect Avenue Cleveland 15, Ohio

ANNOUNCES TWO MAJOR NEW DEVELOPMENTS in GLASS FABRICS!

Soft-Flex Decorative DRAPERY FABRICS...

Here, finally, is a glass fabric that has the softness, feel and drape of the finest silk; that is both fire and flame resistant and moth and mildew-proof; that is washable and dries in 20 minutes with no need for ironing; and finally, that is completely fade-proof.

SOFT-FLEX carries the seal of approval of the State Fire Marshal's office and has passed all tests of the National Board of Fire Underwriters and the National Flameproofing Institute

Because of continuous production methods, it is possible to guarantee that from one end of a piece of yard goods to the other, regardless of its length, the color will be identical. The whites, which include prints of white on white, are snow-white, and their softness allows a natural drape of sheer beauty.

SOFT-FLEX processed glass fabrics will also be available in original, exclusive designs by Waterway, at the strikingly low retail price of $3.00 a yard.

For details, or information and special designs to order, write, wire or telephone Waterway Projects, Inc., TODAY!

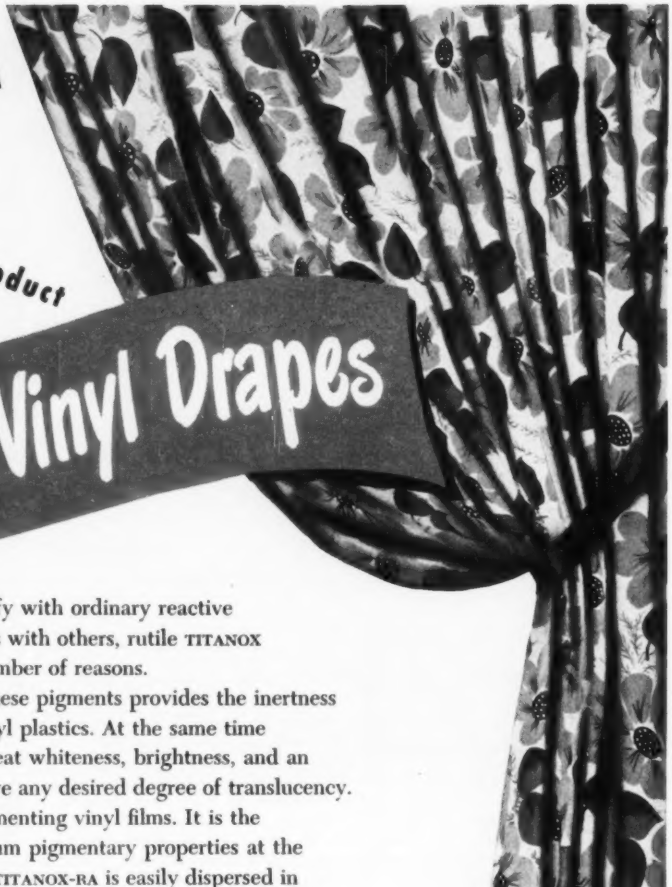
INC.

1012 NORTH HIGHLAND AVENUE
LOS ANGELES 38, CALIFORNIA

TITANOX-RA

helps evolve a new product

Printed Vinyl Drapes



• Vinyl plastics are tough to opacify with ordinary reactive pigments. Yet with these plastics, as with others, rutile TITANOX pigments prove to be ideal for a number of reasons.

The great chemical stability of these pigments provides the inertness required for compatability with vinyl plastics. At the same time rutile TITANOX pigments provide great whiteness, brightness, and an opacity that can be controlled to give any desired degree of translucency.

TITANOX-RA is first choice for pigmenting vinyl films. It is the most efficient, affording the maximum pigmentary properties at the lowest pigment volume. Moreover, TITANOX-RA is easily dispersed in vinyl polymers, thus speeding production and lowering production costs.

Our Technical Service Department will be glad to help you with your problems in pigmenting vinyl films. Write or phone our nearest office today. Titanium Pigment Corporation, 111 Broadway, New York 6, N. Y., 104 South Michigan Avenue, Chicago 3, Ill.; 2600 South Eastern Avenue, Los Angeles 22, Calif. Branches in all other principal cities.

® TITANOX

the brightest name in pigments

TITANIUM PIGMENT CORPORATION

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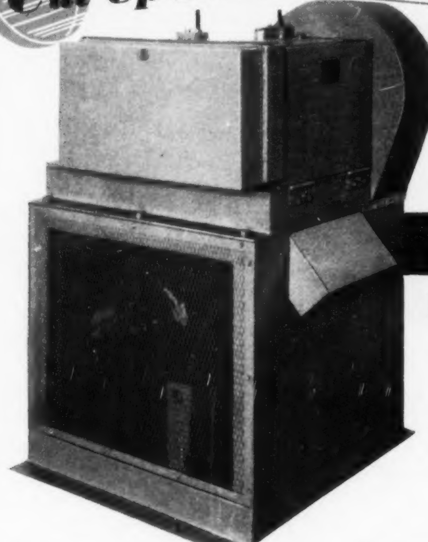
7927

Cut Slabs From Compounding Mills!

Produce Pellets For Molding Material!

Cut Up Continuously Extruded Scrap!

Cut Up Side Shear or Rejected Sheet Material!



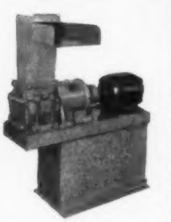
DO ALL 4
and more...
WITH THE

CUMBERLAND
Rotary Chopping Machine

Every day more and more time and money saving uses are being found for this versatile machine.

Bulletin 400 gives full information. It will probably suggest a use for your plant.

CUMBERLAND



PLASTICS GRANULATING MACHINES

Models 0, ½, 1½

Small and medium capacity. Designed specifically for plastics. Rugged and easy to clean. Request Bulletin No. 200.

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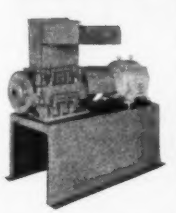

GRANULATING MACHINE

Model 18

Large capacity. Double hung construction. Easy to inspect, dismantle, and adjust. Further details are in Bulletin No. 200.

Now Available!
A NEW, SMALLER MODEL
CUMBERLAND
PELLETIZING MACHINE

Designed specifically for pelletizing material from continuous extrusion machines. For complete details request Bulletin No. 500.

CUMBERLAND *Engineering Company Inc.*
BUILDERS OF BETTER MACHINES FOR THE PLASTICS INDUSTRY
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FROM BLUEPRINT TO FINISHED PRODUCT . . .
SPECIFY CARTER FOR YOUR CUSTOM EXTRUSIONS!

Plastics extrusion is our business. With more than 10 years of experience in this field, we are prepared to supply "top drawer" quality extruded plastic shapes to automotive, vacuum cleaner, furniture, electrical, and other diversified industries for functional or decorative applications.

Our modern facilities can produce flexible or rigid extruded sections from any thermoplastic. These extrusions range from thin film tubing to heavy wall pipe and can have outside diameters from 3/32 to 16 inches with wall thicknesses from 0.0015 to 0.250-inch. In addition, we can bend, flare, or swedge sections to comply with your exacting specifications.

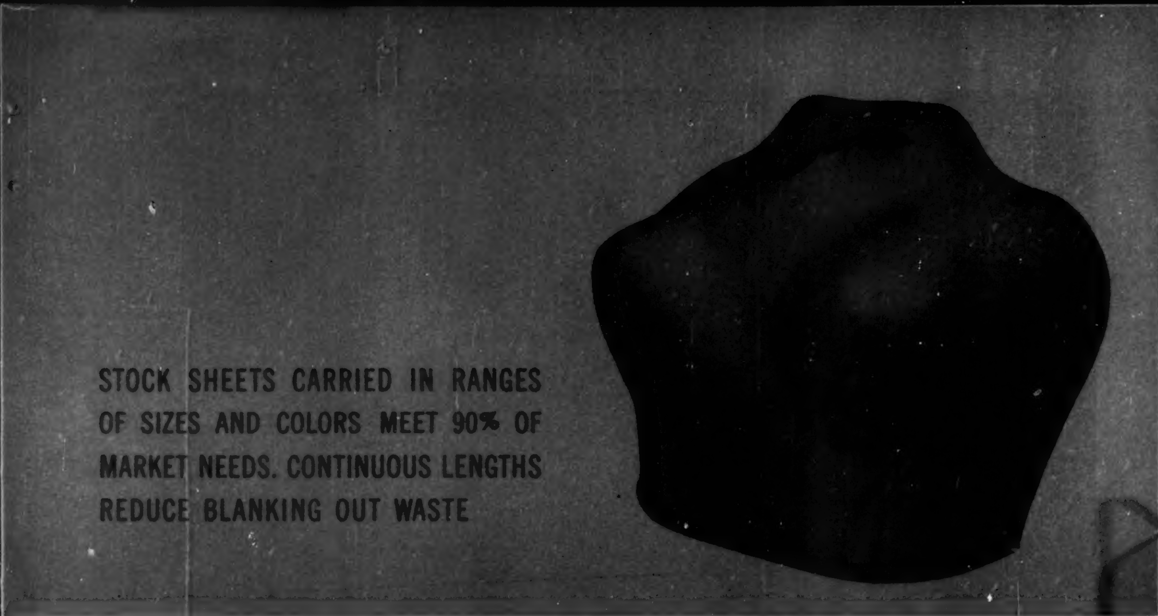
A wide variety of Polyethylene films (sheet and tube) can be furnished for packaging as well as other applications.

Your questions concerning types of plastics, physical properties, fabrication, and availability will receive a friendly reception at the Carter Products Corporation. A highly-skilled, competent group of experienced men is prepared to discuss your problems and to make recommendations.

Let Carter engineers and production men fill your requirements for "top drawer" custom extrusions. Write today for additional information, or call BRoadway 1-6565 for immediate service.

CARLON CP *Manufacturers of Extruded Plastics*

CARTER PRODUCTS CORPORATION
10257 Meech Avenue • Cleveland 5, Ohio
Canadian Affiliates: Micro Plastics, Ltd., Acton, Ontario



New Type ACETATE Sheet Cutting Costs for Fabricators

On July 1st, 1949, Celanese discontinued production of nitrate sheet and turned to the manufacture of a new type, low cost acetate replacement. This new sheet is rated *slow-burning*. It is stored and handled without special precautions. Products made from it are marketed freely under the safety laws of all states. Insurance costs are kept to a minimum.

In nearly every application Celanese* sheets are handled and fabricated by methods similar to the old nitrate type. It can be heat-formed, drawn, blown, printed, laminated, cemented, stitched, sawed and drilled. It is particularly recommended in applications requiring uniformity of gauge and color. Special printing inks are now under development which will permit subsequent plate polishing of the sheet.

Important among the advantages of Celanese acetate sheet is the fact that it can be supplied in continuous length rolls in several standard widths. Fabricators report substantial savings—in initial cost . . . in reduced waste . . . in faster production.

Celanese sheet is available in clear and colored transparents, translucents, opaques and shells. Thicknesses range from 0.003" to .250".

PERMANENT INVENTORY OF STOCK ITEMS

To give fabricators the benefits of lowest possible cost and prompt service on shipments, an extensive inventory is maintained of sheet and rolls in stock colors and gauges.

It is estimated that this unique inventory method will meet the requirements of about 90% of all sheet applications.

APPLICATIONS FOR CELANESE ACETATE SHEET

In sparkling crystal clear and rich permanent colors, the applications for low cost Celanese sheet are virtually limitless: transparent containers and other packaging, sun visors and goggles, motorcycle windshields, automobile side curtains and scuff plates, wall shields, guide card tabbing, children's record discs, price tags and printing, displays and signs, playing cards, bathroom hamper tops, shoelace tipping, handbag frames, safety shields, loom aprons and machine guards.

LAMPSHADES

Celanese sheet has for years been the perfect material for lampshades—stretched, pleated or formed. In addition to its adaptability to stitching, cementing, pleating and forming, the appeal of Celanese sheet to manufacturers has been enhanced by new low prices. The appeal to decorators and homemakers of Celanese plastic lampshades continues to be the pastel loveliness of delicately diffused colors which are available from stock in a most complete range.

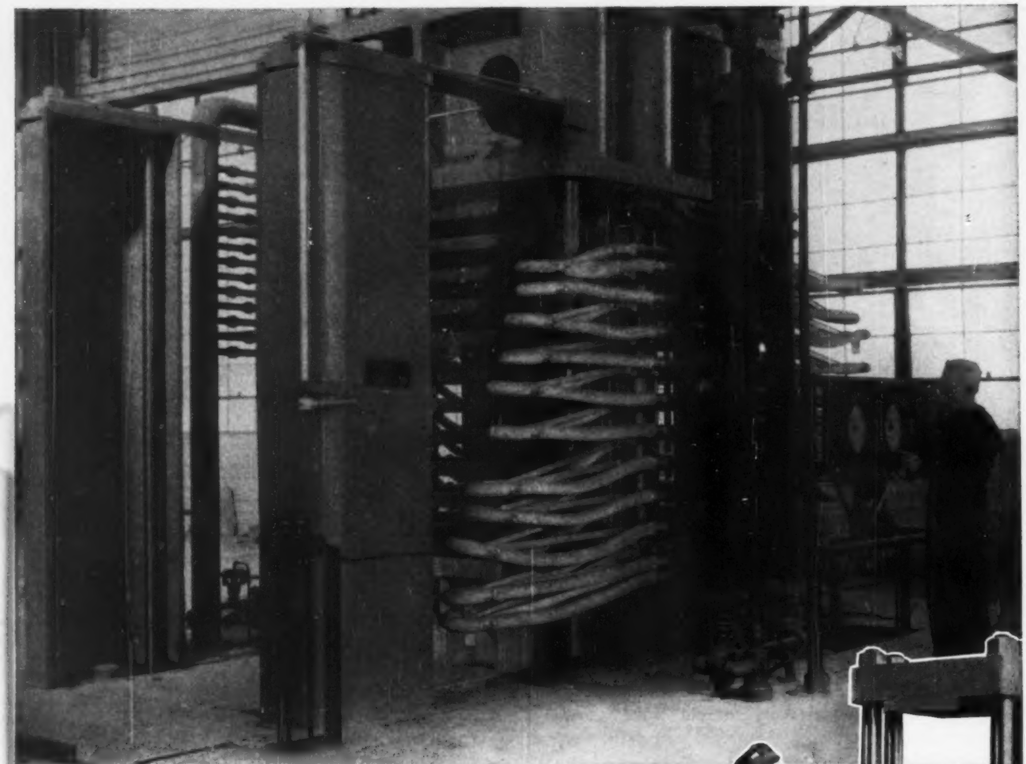
OPTICAL FRAMES

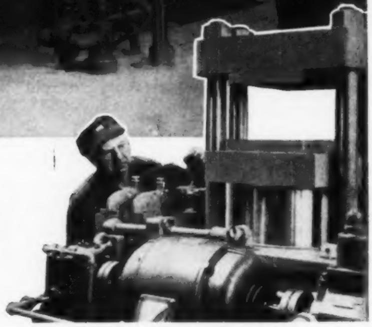
A special Celanese acetate sheet, available in popular colors, is being evaluated by the optical industry. Formulated for toughness plus dimensional stability and color permanence, this new Celanese sheet meets the exacting requirements of optical applications with complete freedom from restrictions imposed by the inflammability of traditional nitrate materials.

As the originators and producers of plastic sheet since 1882, Celanese recommends this new sheet to manufacturers now using higher priced materials. If you have a particular problem or a special application, you are invited to get in touch with a Celanese representative. He can supply you with the latest test and field data and a list of sizes, gauges and colors available from stock.

Celanese Corporation of America, Plastics Division, Dept. 101-A, 180 Madison Avenue, New York 16, N. Y.

*Reg. U. S. Pat. Off.





HYDRAULIC PRESSES

in a wide range of sizes and capacities

If you're considering the addition of new presses, we suggest you talk with our engineers and see what we have to offer. It's hard to beat—a combination of long experience in the business, high technical skill, and unexcelled facilities.

Bethlehem is geared in every way to produce hot-plate, molding, and metal-forming presses. These can be custom-built in a great variety of sizes. Shown on this page, for example, are a 5,000-ton unit and a little fellow of only 110-ton capacity.

When you order a Bethlehem press, you may specify self-contained or separate hydraulic power equipment. We can supply either type. Or, if you choose, we can furnish the job without power plant or accessories.

A Bethlehem-built press will serve you well for years to come. Phone, write, or wire us the next time you're in the market . . . we'll co-operate in every possible way.

BETHLEHEM STEEL

BETHLEHEM
Custom-Built
HYDRAULIC PRESSES
FOR
PLASTICS • WALLBOARD • FIBER BOARD
VULCANIZING • METAL-FORMING

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation
Export Distributor: Bethlehem Steel Export Corporation

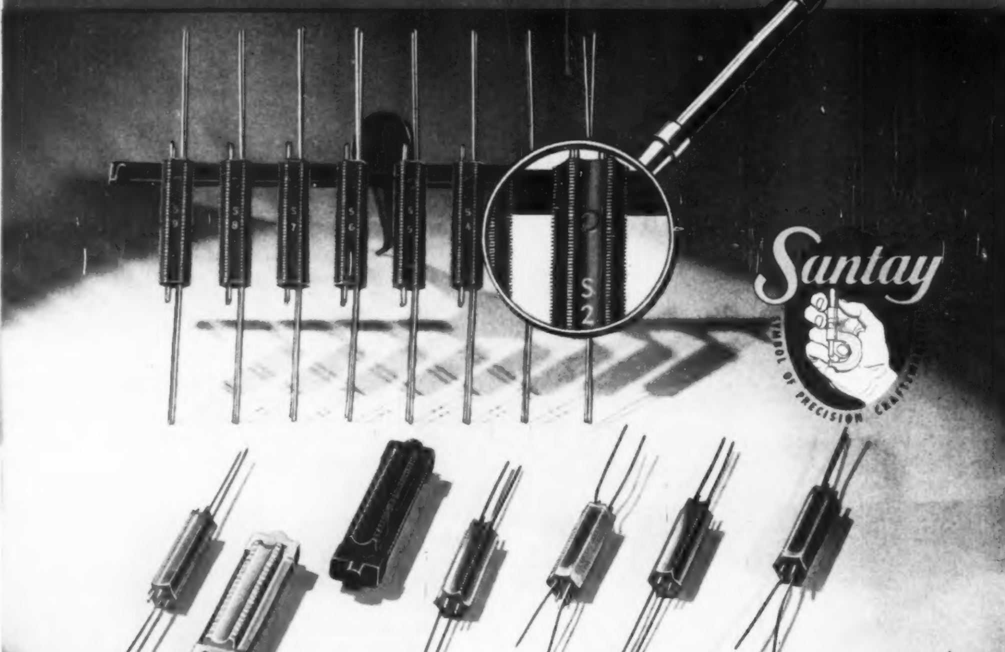
TOPS IN MOLDED COIL FORMS

Only the finest in custom injection molding could produce these coil forms for RCA and Philco. Approached originally because our customer was dissatisfied with a similar *compression* molded form, Santay *designed, engineered and produced in less than three weeks a completely acceptable injection molded coil form,* although it was the first time this problem had presented itself to Santay engineers.

Molding in place a twenty-six T.P.I. double lead thread with the helix angles in place as specified, with perfect threads .019 from land to land .010 deep and with four lead .032 diameter bus wires molded in place for each coil form in perfect alignment, was a natural progression of co-ordinated organization of plant personnel to solve a difficult problem. Thirty-two individual inserts are molded in place with each shot of eight cavities molding on an over-all cycle of forty-seven seconds. Over 14,000 coil forms per day are produced from a single mold. A larger mold of this type is in construction which will mold forty-eight wire form inserts in place on the same cycle.

Philco also asked for the construction of a larger but similar type coil form presenting a somewhat different problem. Using two single lead threads with the helix angle molded in place, the specifications requested step up spacing of the second thread starting .012 from lead of the first thread increasing .0014 per turn. Each thread is molded correctly in place and both customers have acknowledged the ingenuity used in producing these excellent coil forms. The cost saving of such a form has been considerable both in the molded form price as well as increased savings in their assembly operations during the coil winding process.

Reputations are not built by accident. Ours is based on *making good* with every tough job which has come our way. Keeping our customers completely satisfied and out of trouble is a policy of long standing. We sincerely believe that we can prove to any manufacturer the benefits of using SANTAY molded parts. Send us your inquiries and questions concerning quotations and facilities for producing your requirements. Cost estimates and consultation do not obligate you in any way.



INJECTION MOLDING AND METAL STAMPING • ELECTRO-MECHANICAL ASSEMBLIES

SANTAY CORPORATION, 355 NORTH CRAWFORD AVE., CHICAGO 24, ILLINOIS

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NOMINATIONS
ARE NOW BEING
ACCEPTED FOR

The John Wesley Hyatt Award

NINTH
ANNUAL
AWARD

1941—**DR. DONALD S. FREDERICK**
Rohm & Haas Company
Philadelphia, Pennsylvania

1942—**MR. FRANK SHAW**
Shaw Insulator Company
Irvington, New Jersey

1943—**DR. STUART D. DOUGLAS**
Carbide and Carbon Chemicals Corporation
South Charleston, West Virginia

1944—**MR. WILLIAM ILER BEACH**
North American Aviation, Inc.
Los Angeles, California

1945—**MR. VIRGIL MEHARG**
Bakelite Corporation
Bound Brook, New Jersey

MR. PAUL ZOTTU
Electronic Heating Equipment Mfg. Co.
Cambridge, Massachusetts

1946—**DR. JOHN J. GREBE**
Dow Chemical Company
Midland, Michigan

1947—**MR. JOHN D. COCHRANE, JR.**
The Formica Company
Cincinnati, Ohio

1948—**DR. GEORGE T. FELBECK**
Carbide and Carbon Chemicals Corporation
New York, N. Y.

The John Wesley Hyatt Award is offered annually for outstanding achievement in the field of plastics. The Award is made by the Committee to that individual who in its opinion made the greatest contribution in 1949 to the progress of the plastics industry. The winner receives the John Wesley Hyatt Gold Medal and $1,000.

To be eligible, nominees need only be connected with the plastics industry. For example, chemists, laboratory technicians, toolmakers, molders, executives are typical qualifiers. Any number of entries may be submitted. There is no entry fee.

Statements of qualification (Entry Blanks) are now in the mail to the industry. Additional blanks or further information may be obtained from the Committee Secretary, William T. Cruse, 295 Madison Avenue, New York 17, N. Y.

CP50-1

Metasap Stearates smooth the way

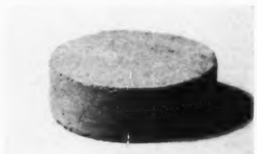
to increased output...
lower production costs...
better molded products

Testing the effect of Metasap Calcium Stearate in molding compounds at the Watertown Manufacturing Company plant, Watertown, Connecticut.

Preforms not containing Metasap Calcium Stearate require 50-lbs. of pressure in order to eject them from mold. Often they are delaminated in the ejection process, as shown below.

Preforms containing Metasap Calcium Stearate are easily released with only 10-lbs. of pressure. Delamination is thus avoided, and perfect preforms obtained (see photograph below).

Results obtained at Watertown, over a long test run, have demonstrated that preforms containing Metasap Calcium Stearate can be ejected, in perfect shape, with less than 25% of the pressure required for those that do not contain this outstanding lubricant.



Prove this for yourself . . . Simply mold two sets of similar preforms from (a) a molding compound containing Metasap Calcium Stearate, and (b) the same compound without the stearate. Determine the pressures required to eject these preforms from their respective molds, by subjecting them to precision tests on a "Plastiversal" or similar testing machine.

You'll find that preforms which contain Metasap Calcium Stearate will be ejected much more easily than those which do not.

Here's the evidence . . . that Metasap Stearates operate to effect substantial production economies all along the line . . . and assure better products, too. For lower ejection pressures provide the following important advantages:

With preforms—molding can be done with machine of less tonnage;
—delamination, due to high pressures, is avoided;
—molding materials are conserved (because of little or no preform breakage).

With finished products—output is increased (because molded pieces are quickly and easily released from molds);
—rejects are decreased (because clean-cut pieces with more marketable finish are obtained).

IN ADDITION, mold life is increased because molds are not stained, and scoring is practically eliminated.

If you employ intricate mold designs and stress high precision fabrication, you will find Metasap lubrication especially advantageous.

For complete information, write

METASAP CHEMICAL COMPANY, HARRISON, N. J.

Chicago • Boston • Richmond, Calif. • Cedartown, Ga.

METASAP CHEMICAL COMPANY REG. U.S. PAT. OFF.

Stearates

of Calcium • Aluminum • Lead • Magnesium • Zinc


300,000!
KODAK


NOW... ALL FOUR
ONE MACHINE!
COMPOUNDS · EXTRUDES · RECLAIMS SCRAP · PELLETIZES

OPERATIONS ON

It's the amazing Compounder-Extruder*—and its tremendous advantages will be immediately apparent to every molder and extruder. Here is a single, compact machine, operating on entirely new principles, that does all the jobs generally performed by four separate types of equipment.

Because Compounder-Extruders are obtainable in five sizes, you are certain to find the model whose output meets your need. The smallest has an average compounding and extruding capacity of 100 pounds per hour, while the largest will turn out as much as 2000 pounds hourly.

Injection molders will find that the Compounder-Extruder produces completely compounded injection molding pellets from raw materials . . . into the hopper at one end go the resins, fillers, plasticizers and colorants and out at the other emerges a uniformly pelletized 100 per cent compounded mixture ready for immediate use in injection molding machines.

Extruder will find that the Compounder-Extruder slashes raw material costs and eliminates completely the need for maintaining costly inventories of numerous odd lots of special formulations. They will find that the Compounder-Extruder will both compound and extrude in a single pass and that henceforth they will need only to stock a few varieties of uncolored raw materials instead of the welter of odd lots presently required.

In addition to compounding, extruding, or pelletizing, the Compounder-Extruder *solves your scrap problem.* Strips, strands, rods, odd cross sections, or what have you, may be fed into the hopper. Grasped by the counter-rotating dual worms, the material is pulled into the barrel where it is plasticized and pelletized, ready for further processing, or extruded into a finished shape if so desired.

The Compounder-Extruder gives plastics processors an unparalleled opportunity to make major reductions in overhead, raw material, and processing costs. From the compounding of virgin materials to the reclamation of your scrap, you are assured of quality and quantity output. We urge you to write now for full specifications, prices and delivery dates of the Compounder-Extruder.

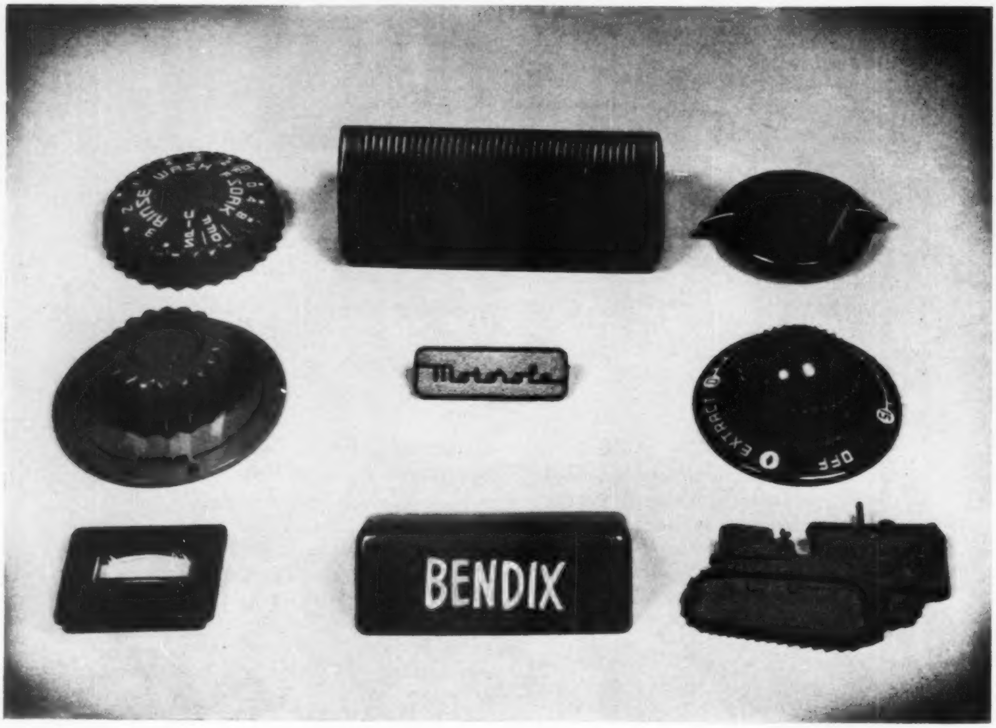
ADDRESS YOUR REPLY TO

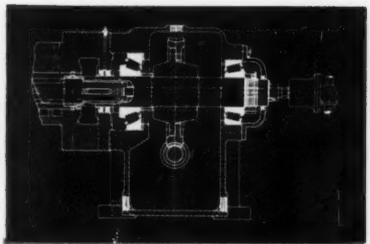
machinery division

WELDING ENGINEERS, INC.

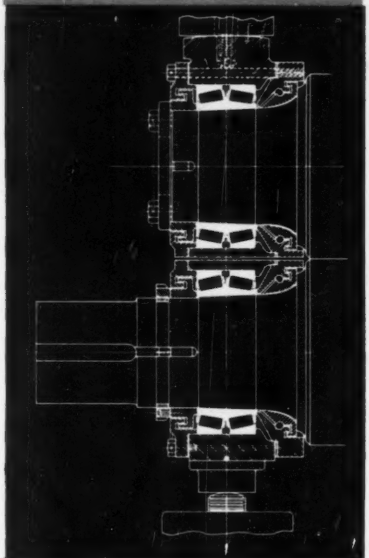
NORRISTOWN, PENNSYLVANIA

**Patents issued and pending*

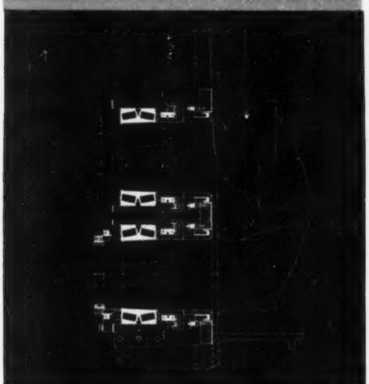

RINSE
WASH
Motorola
EXTRACT
OFF
BENDIX



Timken bearing applications in extruders.



Timken bearing application for roll necks of mills.



Timken bearing applications in mixer.

HOW TO MAKE YOUR PLASTICS EQUIPMENT DO MORE WORK WITH LESS PLAY . . . . . .

Your plastics processing equipment will do its job more efficiently and last longer when every rotating shaft is mounted on Timken tapered roller bearings.

Timken tapered bearings hold shafts in true alignment, keep gears meshing smoothly. Due to their tapered construction, Timken bearings take any combination of radial and thrust loads. Special thrust bearings or washers are unnecessary. Design can be simplified — space saved.

Timken bearings are manufactured to extreme precision. Their true rolling motion practically eliminates friction in moving parts. Line contact between the rolls and races provides maximum load-carrying capacity.

Made of the finest steel ever developed for tapered roller bearings — Timken fine alloy steel — Timken bearings last the life of the machine in which they are used.

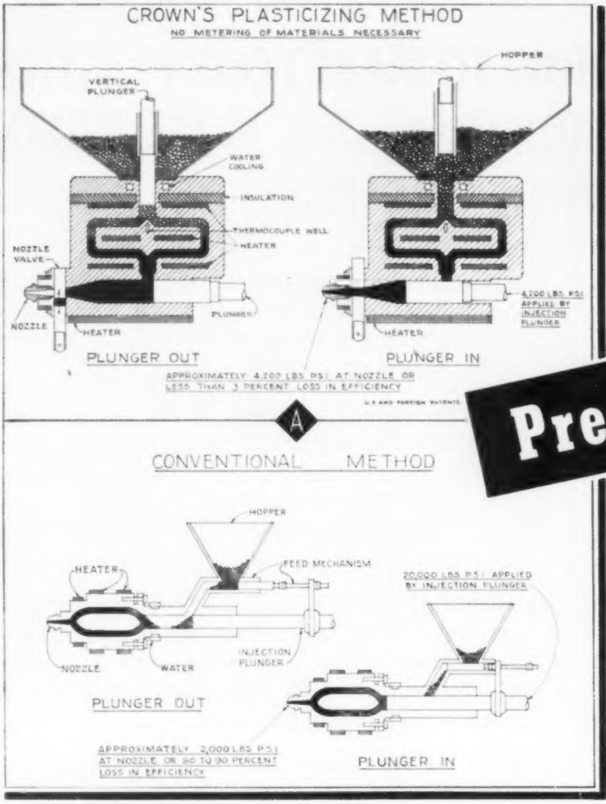
No other bearing can bring you *all* the advantages you get with Timken bearings — backed by fifty years of research and development. Make them standard in all the machinery you buy or build. And look for the trade-mark "TIMKEN" on every bearing. The Timken Roller Bearing Company, Canton 6, Ohio. Cable address "TIMROSCO".

TIMKEN

TRADE-MARK REG. U. S. PAT. OFF.

TAPERED ROLLER BEARINGS

NOT JUST A BALL · NOT JUST A ROLLER · THE TIMKEN TAPERED ROLLER BEARING TAKES RADIAL AND THRUST LOADS OR ANY COMBINATION



MORE PROFITS

with . . .

Pre-Plasticizing

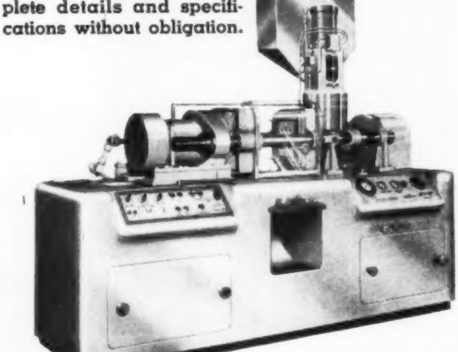
Patented Moldmaster Principle Speeds Production . . . Slashes Costs

Pre-Plasticizing is an amazing NEW principle of preparing plastic material for injection. The Moldmaster Pre-Plasticizing chamber liquifies the granular plastic material before it reaches the injection cylinder. Since the injection plunger operates in a fluid material, there is negligible loss of injection pressure. This makes possible precision molding at injection pressures much lower than conventional machines.

A large volume of correctly plasticized material is available at all times. There is no delay between shots . . . no slow-down when molding near capacity. Adjustment to meter the plastic charge is entirely eliminated. The vertical plunger operates automatically, replacing granulated plastic in the pre-plasticizing chamber whenever the injection cylinder is charged.

The Improved MOLDMASTER also features a NEW Hydraulic Mold Clamping Mechanism that eliminates use of toggles and link-pins and the troubles they cause.

The MOLDMASTER is available in 4, 6, 32, and 56 ounce capacities. May we show you how much larger your profits can be with Crown MOLDMASTER Injection Molding Machines. Write for complete details and specifications without obligation.



*Patent applied for

Moldmaster

INJECTION MOLDING MACHINE

CROWN MACHINE AND TOOL COMPANY
2800 W. Lancaster — Fort Worth, Texas

HERE NOW!

a new patented* method for printing polyethylene bottles

Color Engraving by Modern Art decorates polyethylene bottles perfectly

**Fully protected by U.S. Patent 2,491,947. Foreign patents pending.*

It's been tested! It's been proved by thousands of applications! It's Modern Art's new color engraving process for decorating polyethylene bottles with a debossed, color wiped-in effect.

Now available! Dress up your polyethylene bottles with crisp, colorful, permanent designs and lettering . . . all colors, including gold and silver.

NEW LARGER FACILITIES

Now Modern Art can serve you better than ever before . . . We've just moved into a new, larger plant where we Color Engrave *all* plastics . . . everything is set-up for fast, efficient production . . . waste motion has been cut to the bone. The result? Just ask for quotations . . . you'll discover that the result is superior reproduction, lower prices. Write today.

MODERN ART PROCESS
COLOR ENGRAVING
PLASTIC DECORATORS

Modern Art Printing Co.

PLASTIC DECORATIVE SPECIALISTS

67-73 Kent Street, Brooklyn 22, New York • EVergreen 3-4388

One Piece TV Lenses

FOR 10" AND 12½" TV PICTURE TUBES

Here's the complete, economical answer to your TV Lens problems. Custom molded in one piece by Erie Resistor, these lenses save in assembly costs—add to set appearance.

These one piece lenses for 10 inch and 12½ inch picture tubes are custom molded *clear, to any design.* The frame is painted after molding. They meet all Underwriters' requirements.

Regardless of your plastic needs—a functional product part, a sales-slanted durable package, or a lasting identification symbol—you will find the answer at the Plastics Division of Erie Resistor, the pioneer custom injection molder. Write for your copy of "Who We Are—What We Do".

ER
SYMBOL OF QUALITY

Plastics Division

ERIE RESISTOR CORP., ERIE, PA.

LONDON, ENGLAND . . . TORONTO, CANADA

WESTINGHOUSE

CHASE-SHAWMUT

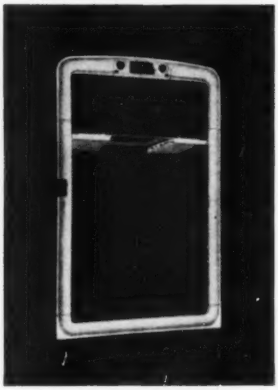
BRIDGEPORT BRASS

WE CAN REPEAT THESE PLASTIC SUCCESS STORIES FOR YOUR PRODUCTS!

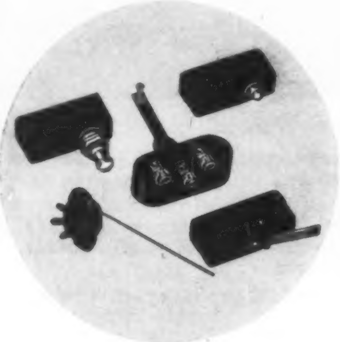
Bridgeport Moulded has the experience, equipment, and skill to solve all plastic problems!

Our "Plastic Engineers" are solving plastic problems like those shown on this page all the time. Our success is based on the accumulated skill and knowledge gained in producing superior plastic components for companies in every field of American Business. On top of this, we have the most modern machinery and facilities available. Our die maintenance and repair shop is complete in every detail. We know plastics intimately and can recommend just the right product and moulding method for your particular job.

Add it all up. You can see why important companies everywhere call on us so often. Perhaps we can help you, too! Write today for consultation. No obligation.



New 1950 ***Westinghouse*** *Refrigerators depend on special* ***Bridgeport Moulded*** *baffles and breaker strips for improved cold control.*



Famous precision switches of Mu-Switch division of ***Chase-Shawmut*** *are made with* ***Bridgeport Moulded*** *plastics.*

Highly specialized ***Bridgeport Moulded*** *plastic caps contribute to the success of famous* ***Bridgeport Brass*** *Aer*A*Sol products.*

BRIDGEPORT MOULDED PRODUCTS, INCORPORATED

BOX 3276-O BARNUM STATION BPM BRIDGEPORT 5, CONNECTICUT

Get SPECIAL ATTENTION For YOUR Problem . . .

WITH

VARCUM PHENOLICS

● In today's competitive market, you can't afford haphazard methods in buying raw materials. Your phenolic resin requirements can best be met through the *special attention* that VARCUM gives to your particular problem.

Naturally, you have specific characteristics in mind that you wish a resin to lend to your product. Whatever they may be, rest assured that VARCUM will always devote the knowledge, the patience, and the enthusiastic effort that is so vital to the successful solution of any important problem.

Sure . . . go ahead and say it! This all sounds "too good to be true" . . . but we can back it up with results. Just give us a call on your next phenolic problem. It needn't involve a BIG order . . . just make it a TOUGH one.

VARCUM CHEMICAL CORPORATION

NIAGARA FALLS, NEW YORK

NEWS FLASH!!

 night at Ancker hospital for treatment of a head injury suffered when he was knocked

his shirt. The ... took place between 9 and 10:30 p. m.

PRESS INSTALLED

ST. PAUL, MINN.—Oct. 19, 1949. Workmen today tied up traffic more than six hours while installing a huge new injection molding press at the plant of Minnesota Plastics Corp., 366 Wacouta Street. This machine, capable of producing extremely large plastic pieces, had to be taken through the side of the building because of its immense size.

With the installation of this equipment, Minnesota Plastics Corp., already one of the leading molders in the Middle West, now takes its place among the nation's top producers of plastic parts.

Rain Or Snow

U. S. Won't Hi

ATTENTION MANUFACTURERS—We invite your inquiries on large plastic parts, which we are now capable of producing with the same high standards of workmanship and service upon which our reputation has been built.

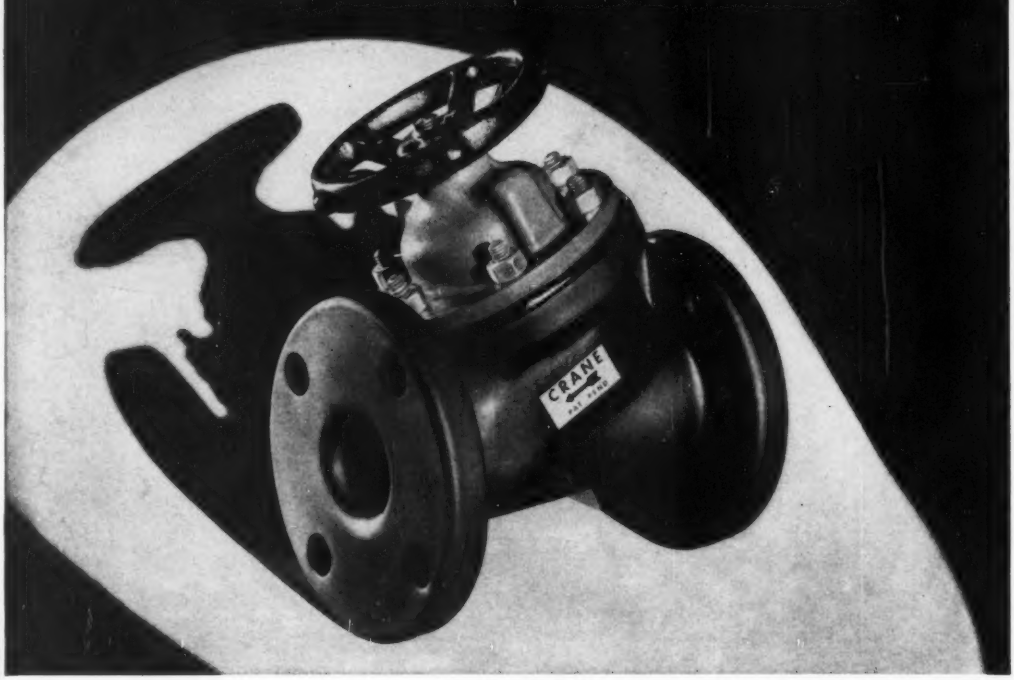
INJECTION MOLDING
MINCOR
"YOUR PLASTICS DEPARTMENT"

MINNESOTA PLASTICS CORP.

366 WACOUTA • ST. PAUL 1, MINN.


LUBRICATION
SUNOCO

Tricky valve-coating problem licked ... by the ANODE PROCESS



Crane Diaphragm Valve, made by The Crane Company, Chicago 5, Ill.

FOR years corrosive liquids and gases have caused untold headaches to valve users. Metal would be eaten away, production interrupted, replacements needed.

A special corrosion-and-abrasion-resistant coating material was developed. But how to apply it satisfactorily to valves had engineers stumped, until they investigated the American Anode process. *That* licked the problem, made it possible to coat vulnerable valve parts inside and out perfectly. An Anode-process-coated valve is shown above.

This process is a specialized method whereby latices and mixes are deposited and converted to solid materials, on a wide variety of forms. Surgical gloves, sinus masks, dish drains, duck decoys—those are just a few examples of the wide variety of articles produced the Anode way. Hundreds more profitable applications are possible.

American Anode can do a job for you from start to finish in our own factory. We have the materials, equipment, and trained personnel. Or, we can set up the process in your plant, supply materials and technical advice—even machinery.

If your products are in the textile, paper, toy manufacturing, or electro-plating fields, check with American Anode. We may be able to help you improve them or produce new ones, economically. For complete information, please write Dept. AC-1, American Anode Inc., 60 Cherry Street, Akron, Ohio.

AMERICAN ANODE

CRUDE AND AMERICAN RUBBER LATICES, WATER CEMENTS AND SUSPENSIONS, AMERAN RESIN PASTES

ANOTHER PLASTIC MOLDING OF *Distinction*

BEAUTIFUL

Silverware Chests

MOLDED BY

PLASTIC MOLDERS

(Chicago)

The plastic moldings for this Marshall-White silverware chest weigh six pounds and must be held to close tolerances to provide a dustite seal between the lid and lower section.

From designing the molds to the finished parts, this masterpiece in urea and phenolic is completely produced by Plastic Molders (Chicago).

This is typical of the many custom molded products being skillfully produced for hundreds of satisfied customers.

We're equipped to do your job too—large or small—with speed, efficiency and at amazingly low prices.

Be sure to get our quotation on your next injection or compression molding job.

Our Modern Equipment Includes:

- ★ Modern Tool Room
- ★ Compression Presses from 100 tons to 750 tons
- ★ Transfer Presses from 100 tons to 400 tons
- ★ Injection Presses from 8 oz. to 32 oz.
- ★ Fabrication, Assembly and Painting of All Types of Plastics

Call Us With Your Plastic Molding Problems

PHONE—CHICAGO, *PAlisade 5-6750*

Representatives in Principal Cities

PLASTIC MOLDERS, INC.

OF CHICAGO

Compression and Injection Molders

APPROVED MOLDED PRODUCTS

MOLDINGS UP TO 25 LBS.

3670 Milwaukee Ave.—Chicago 41, Illinois

MASTRO CLOTHESPINS

prove that plastics can do the job better

3½" Standard
(Actual size)

Mastro Spring Clothespin
(Actual size)

4½" Standard
(Actual size)

Within a very short time, Mastro clothespins have gone a long way towards ousting the traditional wooden clothespin from America's homes.

Colorful, long-lasting Mastro Clothespins outperform the wooden ones on many counts — their superior design lets them hold securely on both ordinary clothesline and on thin wire; they're always clean, always new; their smooth, satin finish eliminates the danger of snagging delicate fabrics; and they don't split or lose their spring. They are *engineered* for their job.

Quality custom molding calls for the same superior designing and know-how with plastics that the manufacture of Mastro Clothespins does. The obvious conclusion . . . see Mastro for custom molding.

Replacement or a refund of money if not as advertised therein — Guaranteed by Good Housekeeping

MASTRO PLASTICS CORP.

3040 Webster Avenue, Bronx, New York

Mastro molds 350,000 clothes pins daily. All attractive colors. Low in cost.

ROGERS INTRODUCES

NEW MEDIUM-HIGH IMPACT PLASTICS

Readily Preformed • Low Bulk Factor • Excellent Finish

RX 400 is a series of economically-priced medium-high impact thermosetting phenolic molding materials just announced by Rogers Corporation. These new compounds combine the advantages of strength with good preformability and excellent finish. They are dustless, fast-curing and may be molded in the same molds used for general purpose compounds.

Already in wide use for numerous large applications, Rogers RX 400 materials speed production of high strength components. Special formulations and colors are available. Write now for full details and samples.

SOME TYPICAL APPLICATIONS

SWITCH BASE

TRANSFORMER HOUSING

KNIFE HANDLE

CONDUIT END BUSHING

SOLDERING IRON HANDLE

REMOTE CONTROL HOUSING

MOTOR HOUSING

CONTROL BOX

ROGERS CORPORATION

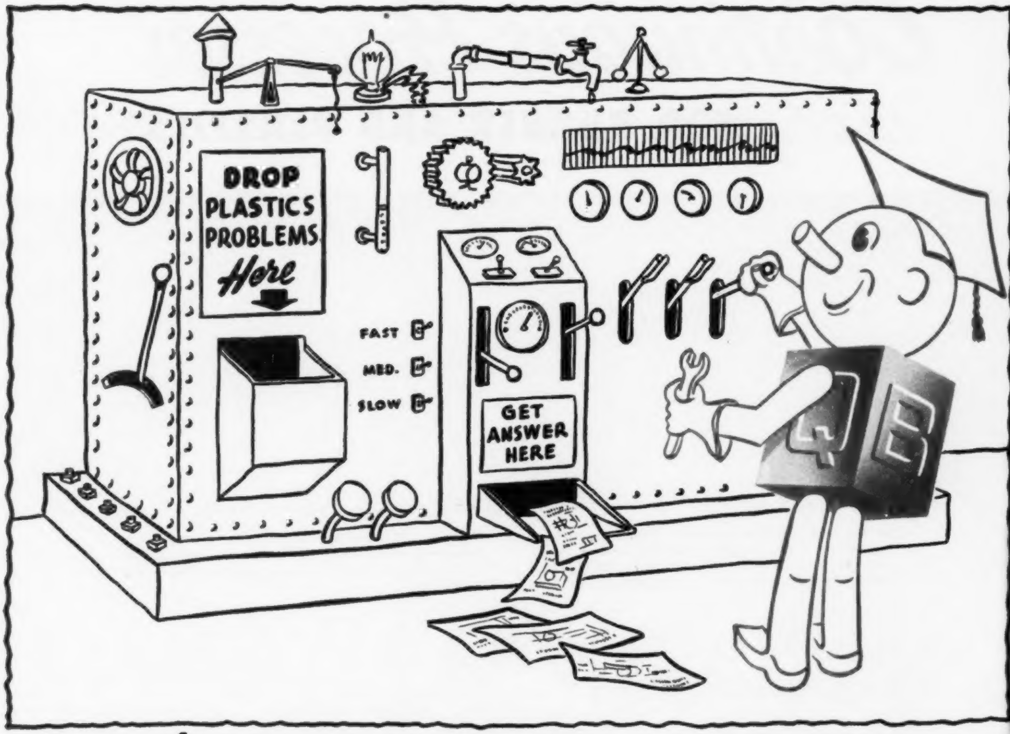
MANCHESTER, CONNECTICUT DEPT. P

ROGERS

SPECIALTY FIBRE PRODUCTS
ELECTRICAL INSULATING MATERIALS AND BOARDS
DUROIDS • SHOE PRODUCTS

MOLDING AND LAMINATING PLASTICS
Boards • Blanks • Pre-shaped Preforms
High Strength Molding Compounds
Laminated Phenolics

COMPLETE FABRICATING SERVICES ON FIBROUS MATERIALS AND LAMINATED PHENOLICS



It isn't as easy as this... BUT "CUBEE" GETS THE ANSWER TO YOUR PLASTICS PROBLEMS!

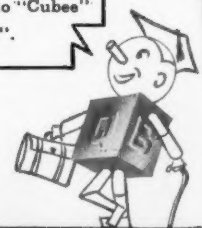
Nope it isn't that easy—it takes lots of planning and designing and figuring before most problems are solved. But we've enjoyed great success at satisfying our clients just the same.

We know that, in order to help you, with your problems, we must have knowledge of materials, design, die-making, production and all the rest. We have those facilities—all under one roof—you see we're specialists in molding plastics parts—from design to finished product.

Call "Cubee" the next time you have a problem in design. We think we can help you.

QUINN-BERRY CORP.
2651 West 12th Street
ERIE, PENNSYLVANIA

Q-B Says:
"When you're planning in Plastics
And you want the very best
Give your problems to "Cubee"
And we'll do the rest".



Quinn-Berry Corp. PLASTICS

Branch Offices

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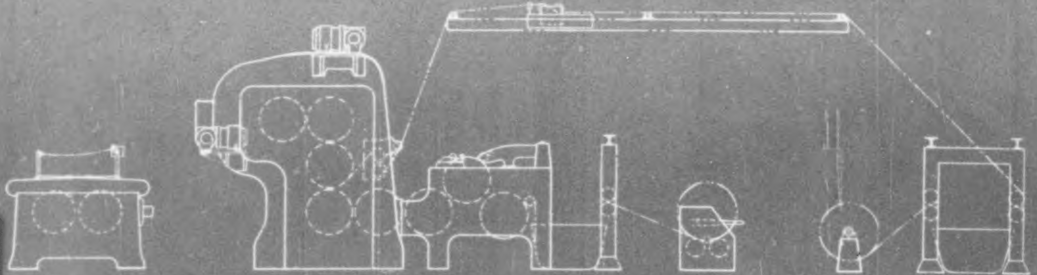
11341 Woodward Avenue
Detroit, Michigan
Townsend 8-2577

MR. W. A. HURTIENNE
4753 Broadway
Chicago 40, Illinois
Longbeach 0028

PARAGON SALES COMPANY
111 S. 22nd Street
Philadelphia 3, Pennsylvania
Rittenhouse 6-5699

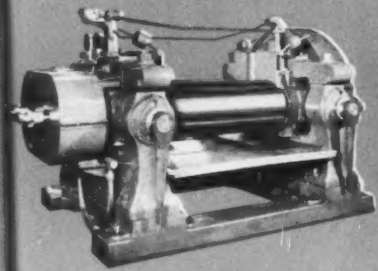
Continuous Processes

FOR RUBBER AND PLASTICS

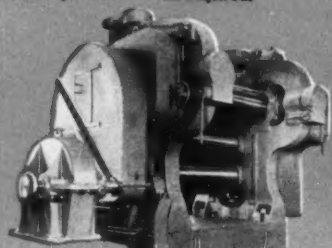


Continuous Calendering Process for Supported or Unsupported Plastic Sheet.

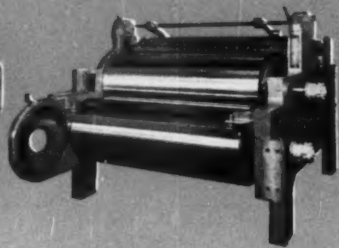
Equipment includes fabric let-off-stand with accumulator scray, fabric centering device, fabric pre-heating rolls, four-roll Calender, cooling rolls, and fabric wind-up with accumulator scray. Also included are facilities for trimming and winding up unsupported sheet. A stock warming up Mill is included, with stock transfer feeding conveyors as required.



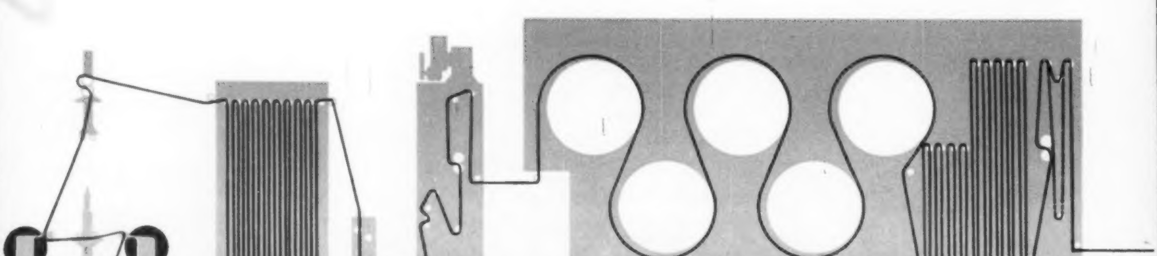
Warming and mixing Mill for plastics, 22" and 22" x 60", equipped with oil flood lubrication system, high pressure rotary joints, and tiltable stock guides.



Four-roll Calender for plastics, 24" x 68", including oil flood lubrication system, bored rolls, adjustable stock guides, high pressure rotary joints, motorized two-speed roll adjustment, and hydraulic roll stabilizing equipment.



Film and Fabric Cooling Roll Unit, with film trimming and wind-up device for mounting at the Calender.



Continuous Tire Fabric Processing Unit.
This double coating train includes pre-dipping, drying, calendering, cooling, and wind-up equipment.

We engineer, build and install continuous processing equipment for the manufacturer of rubber or plastics products. Your inquiry concerning special or unusual requirements is invited. Our engineers are available for consultation.

Buyer preference for your finished plastic product depends on many factors — an important one being your choice of the proper plasticizer.

Pfizer research brings you BETTER PLASTICIZERS

—from which to choose the proper ones for your particular purpose. Through continuing research Pfizer has developed a group of plasticizers from citric acid which have a wide range of desirable performance characteristics and which may solve your special problems.

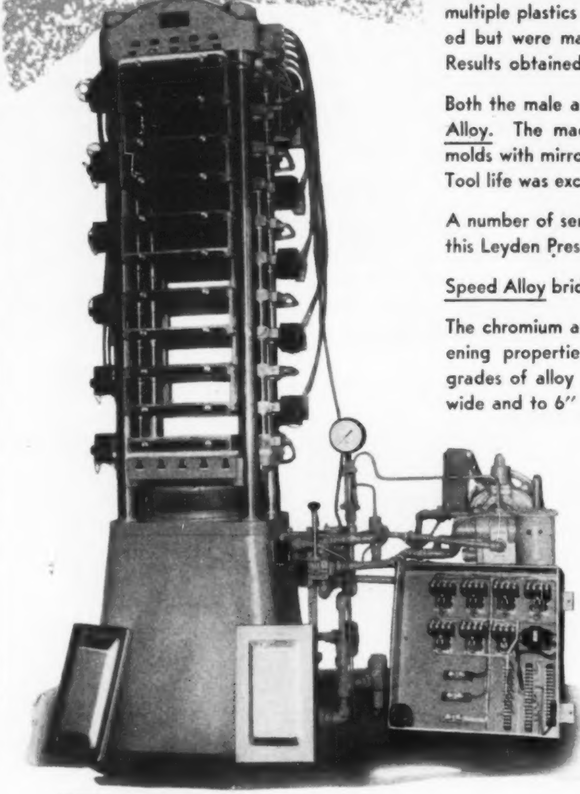
The citrate plasticizers in this group offer special advantages to you because of the versatility of the citric acid molecule, which contains one hydroxyl and three carboxyl groups and offers possibilities for tailor-made plasticizers. Each of these possesses special properties applicable to its use in a certain type of plastic. Examples are the use of Acetyl Triethyl Citrate for Cellulose Acetate and Acetyl Tributyl Citrate for vinyl type resins.
For samples and technical information write: Chas. Pfizer & Co., Inc., 630 Flushing Ave., Brooklyn 6, N. Y.; 425 N. Michigan Ave., Chicago 11, Ill.; 605 Third St., San Francisco 7, Calif.

PFIZER QUALITY ®

PFIZER

Manufacturing Chemists Since 1849

Its princely quality at pauper cost when SPEED ALLOY is used



Speed Alloy hot rolled alloy steel plate was selected by The Leyden Tool Works, Melrose Park, Ill. for the platens on this multiple plastics molding press. Platens were not heat treated but were machined in the as-processed state received. Results obtained were highly satisfactory.

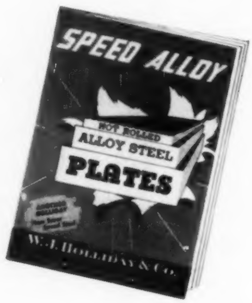
Both the male and female molds are of heat-treated Speed Alloy. The machinability of this unusual steel resulted in molds with mirror-finish obtained with minimum of polishing. Tool life was excellent.

A number of serving trays are produced in a single pass on this Leyden Press, by a Michigan manufacturer.

Speed Alloy bridges the gap between carbon and tool steels.

The chromium and molybdenum content assures deep hardening properties. Speed Alloy out-machines competitive grades of alloy plates. Plates available from stock to 72" wide and to 6" thick.

Send for Bulletin 905. Shows applications—gives cost-cutting facts.



SINCE 1856

W. J. HOLLIDAY & CO.

(INC.)

SPEED STEEL PLATE DIV.
137th & Sheffield Ave., Hammond, Indiana
Plants: Hammond and Indianapolis, Indiana

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Beals, McCarthy & Rogers, Buffalo, N. Y.
Brown-Wales Co., Boston - Hartford - Lewiston, Me.
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Earle M. Jorgensen Co., Los Angeles-Houston-Oakland
Peckover's Ltd., Halifax-Montreal-Toronto-Winnipeg-Vancouver
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Peninsular Steel Co., Detroit, Mich.
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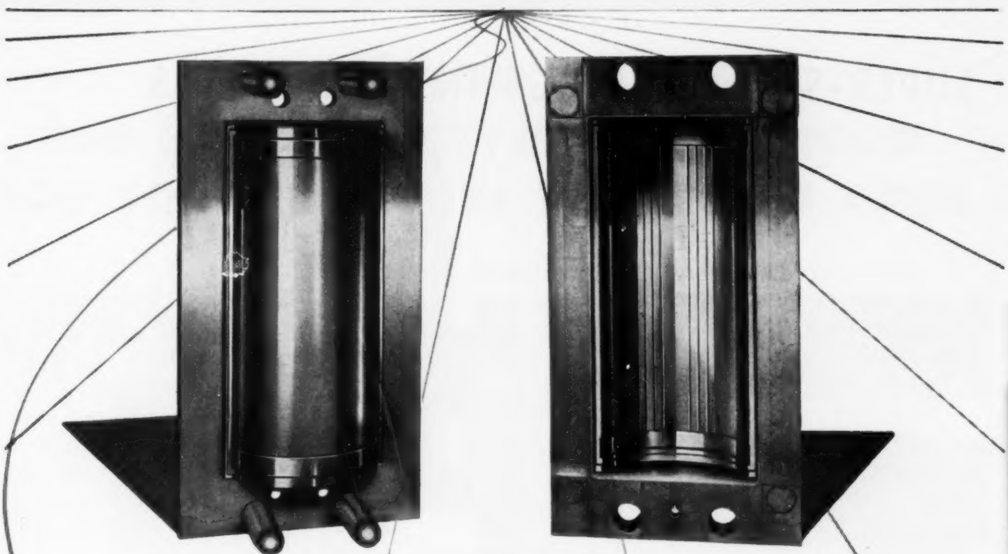
Finish, Accuracy in Plastic Molds



SPECIAL COLD FORGED PARTS • STANDARD CAP SCREWS • HARDENED AND PRECISION GROUND PARTS • SHEET METAL DIES FROM THE LARGEST TO THE SMALLEST • JIGS • FIXTURES • STEAM HEATED PLASTIC MOLDS • SPECIAL PRODUCTION TOOLS • R-B INTERCHANGEABLE PUNCHES AND DIES • DIE MAKERS' SUPPLIES

ALLIED WITH MASS PRODUCTION

PLASTIC molds produced at Allied are machined to meet the most exacting requirements for accuracy of form. Finishing operations produce surface finishes which conform exactly to the molder's specifications, assuring the required quality appearance of every completed part. Whether your demands for molds are ordinary or unusual, we will be glad to submit quotations to you.

ALLIED PRODUCTS CORPORATION

DEPARTMENT 1-P

12627 BURT ROAD DETROIT 23, MICHIGAN

PRECISION • EXPERIENCE • DEPENDABILITY

SUPER-SIZE MOLDINGS IN FAST CYCLES

LOCKING PRESSURE
300 TONS

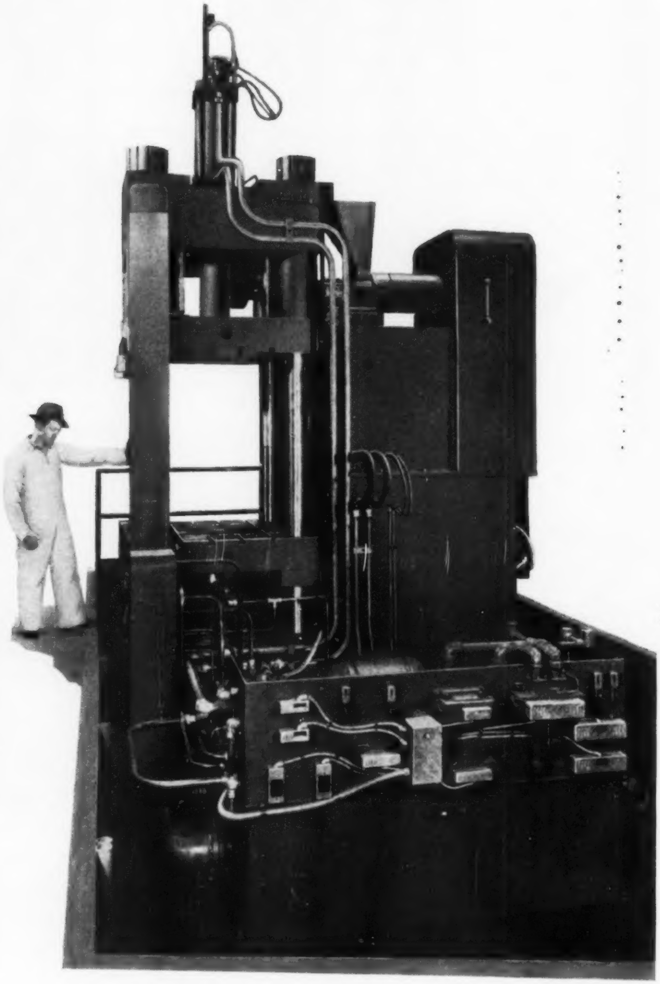
CONTROLLED INJECTION
SPEED 200 IN. PER MIN.

MINUTELY FLOW
CONTROLLED DOWN
TO 20 INCHES PER MIN.

10,000 PSI MAX.
INJECTION PRESSURE

1000 PSI LINE
PRESSURE

UP TO 64" MAX.
DAYLIGHT OPENING



J-C 48-OUNCE INJECTION MOLDING MACHINE

REMEMBER . . . YOU CAN SAVE 5c PER POUND BY COLORING AND INJECTION MOLDING STYRENE ON THE J-C PRESS

*PATENTS APPLIED FOR


IF YOUR PRODUCT has a DATE . . . .
When time is of the essence . . . When contracts have been signed, sealed and delivered . . . when, WHEN, **WHEN?** . . is the explosive question.
THAT'S where Pyro takes over . . . AND DELIVERS!
Years of intensive plastics manufacturing and marketing experience have made Pyro the logical firm for launching a new product or improving an old one.
Planning . . . Engineering . . . Material Selection . . . Development . . . Molding . . . Merchandising Consultation: these are **all yours!** So, let all three of us . . . You, Your Product and Pyro **keep that date.**
Pyro
PLASTICS CORPORATION
UNION, NEW JERSEY

Leading Manufacturers fabricate VISQUEEN film into fast-selling, popularly-priced garment bags, tablecloth covers, curtains, bowl covers, many another household item that wins volume sales.

International Silver adopts radically new packaging—made of VISQUEEN film. Strong, heat-sealed VISQUEEN film envelopes lock out air, retard tarnishing, are transparent for instant pattern identification, take printing clearly. VISQUEEN film also proving ideal for packaging foods—frozen and fresh—hardware items, many others.

Fiber or steel drums lined with VISQUEEN film bring tremendous savings and other advantages to shippers of liquids, semi-liquids and solid materials. One shipper reports 66% tare weight reduction—annual shipping charge savings of $50,000. Entirely eliminates waste at destination—permits 100% product recovery. Also eliminates steel drum cleaning charges—drums go back into service as soon as VISQUEEN film bag is removed. Complete story on request.

VISQUEEN* FILM does it better!

Higher tensile strength—higher tear resistance—the strictest specifications, are making VISQUEEN film the most-wanted polyethylene film in American industry. Rigid quality controls in every step of production assure VISQUEEN film dependability—for hundreds of industrial and commercial applications. VISQUEEN film is a product of The Visking Corporation, pioneer in the development of polyethylene film. It pays to specify genuine VISQUEEN film. Write for details.

VISQUEEN FILM A PRODUCT OF

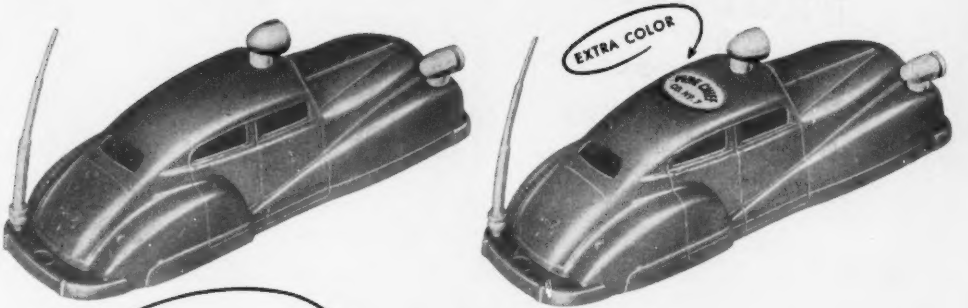
THE **VISKING** CORPORATION

PRESTON DIVISION • TERRE HAUTE, INDIANA

*T. M. The Visking Corporation

HOW TO *Dress-up* YOUR PLASTICS

at low cost — EFFECTIVELY!



and

how Plastic Premiums can acquire vital advertising value, and EXTRA COLOR

This miniature reproduction of Mount Vernon whiskey bottle (a key-and-change carrier) is brown plastic, livened by a yellow label and imprinting!

NOTE how use of a colorful label can add a color-note to the monotonous over-all shade! EVERY plastic toy, novelty or, utensil can be enhanced by the added color-appeal of a label or decoration!

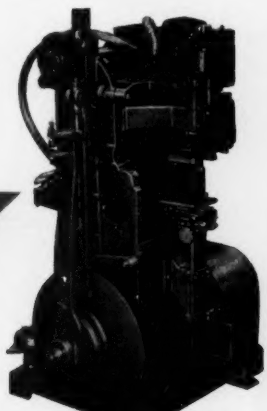
Dozens of proprietary plastic products have doubled their eye-appeal and the utility of the item by the simple application of COLOR labels *permanently* and automatically applied by a Pony *Label-DRI*—the only available machine for applying plastic-coated heat-activated labels to plastic—*plastic-to-plastic!*

Made for volume production! One unskilled attendant can handle single or two-at-a-time *Label-DRI's* with a capacity from 60 to 120 per minute and at very low production costs . . .

It's simple!

LABEL PLASTICS

at 60 to 120 per minute on the PONY *Label-DRI**



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BORKLAND PROCESSES
plastic displays that sell the item
PACKAGE MANUFACTURERS
You are requested to investigate the license arrangements under the Borkland Patents. In United States • England • Canada • Australia • Plants now in operation in leading cities.
ADONIS by RONSON
SHEAFFER'S
More and more molded packages demonstrate their utility and product selling value. Combination shipping and display packages offer real savings for an endless variety of Products . . . transparent and colored plastics . . . tailored to the most exacting demand.
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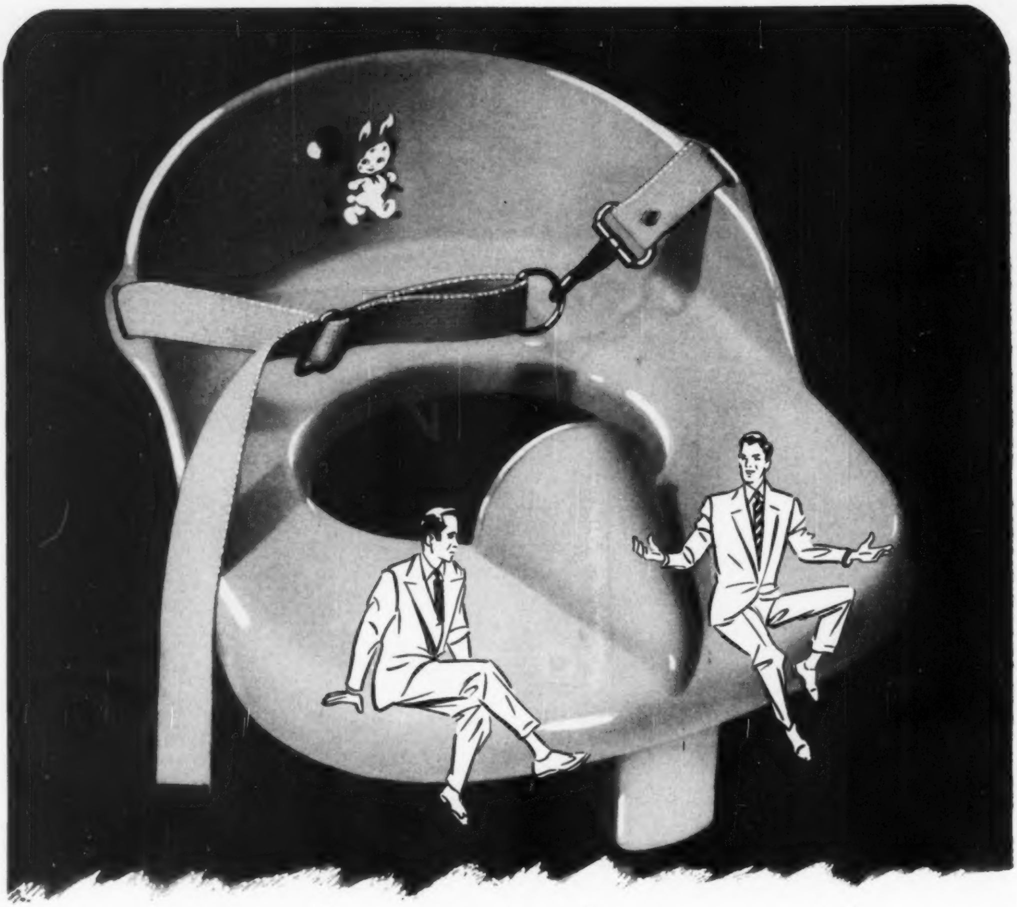

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MANY THINGS ARE BETTER BECAUSE OF PLASTICS

MODERN PLASTICS
VOLUME 27 JANUARY 1950 NUMBER 4

Better . . . in Every Way

PLASTICS BUILD BETTER PRODUCTS AND BETTER VALUES

THE parade of case histories presented in the following pages is but a cross-section of thousands in which plastics have been widely used to produce more goods, less costly goods, goods of superior quality, or goods that could never have been made without plastics.

In this parade are examples from every major industry or product group—examples of improved function, greater durability, lowered cost of production and/or maintenance, enhanced salability, enlarged scope of service, and increased value.

These examples represent the imagination, skill, industry, and determination of the chemist, the engineer, the designer, the foreman, the craftsman, the salesman, and management. They represent the industrial user of plastics, the material maker, the machinery and equipment manufacturer, the mold maker, the molder, extruder, processor or fabricator, the suppliers of specialized services, and the distributors of all products made wholly or partially of plastics.

No matter how modest its banners, this parade cannot be other than triumphant, for it shows how problems were overcome, markets widened, and living standards raised with plastics. Back of each example is a history of material formulation, testing for many types of resistances, design and redesign to make plastics serve best in the product, much study to determine the most economical method of production, cost analysis to establish optimum production rates and cycles, and in many cases quite a lot of trial and error at all phases of the development.

The results well justified the labor, and now each case history can be made the basis of further work.

This parade is a specially dramatized version of the record of plastics' progress that marches through these pages every month. It will continue as scores of case histories, for which space was not available in this issue, are presented in later months, and new examples are added.

Not yet in the line of march, but fairly soon to join the parade, are applications such as a plastics telephone booth, a line of plastic furniture drawers, new approaches to illumination with plastics, an industrial hose with spectacular properties, new electrical insulating materials, a big development in high-impact plastics, important progress in the molding of large pieces and the use of multi-cavity molds, further activities in plastisols and organosols, big new film applications, more combinations of plastics resins with inorganic fillers, and brilliant new work in coatings and adhesives.

To all who have cooperated with our editors in assembling information and illustration for this issue, our sincere thanks. Those case histories on which editorial research has been completed but which do not appear in this issue, will appear in early succeeding issues.

We bespeak the further cooperation of executives connected with still other case histories on which editorial research has been impeded by lack of comparative economic facts.

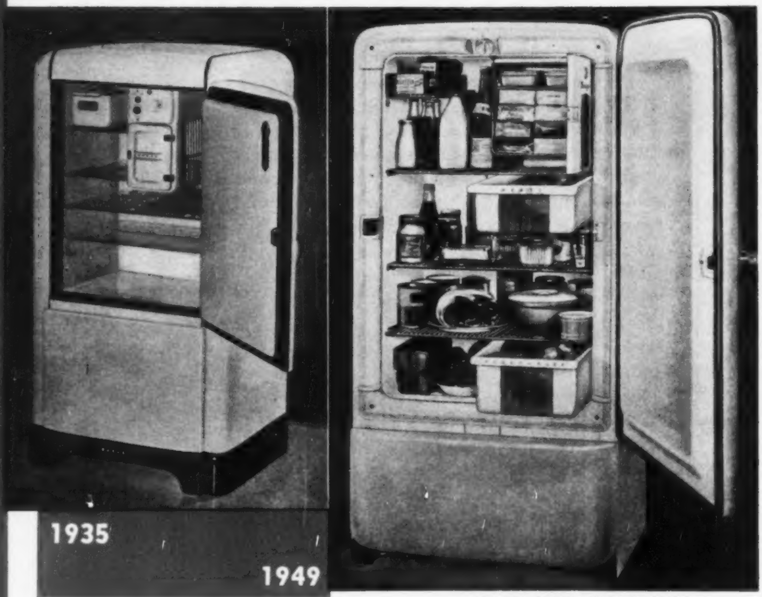
The parade continues. Its theme is and will be the same as it always has been: plastics build better products and better values!

PLASTICS BUILD BETTER PRODUCTS AND BETTER VALUES

REFRIGERATORS

A Pattern of Plastics

Over a period of 15 years, Norge refrigerator engineers have studied plastics, applied them to produce better refrigerators at lower cost



COURTESY NORGE DIV., BORG-WARNER CORP.

Norge Model P-62-6 (left) had only a few phenolic parts. Model R849 (right) has 12 lb. of plastics, including one-piece door liner, molded storage trays

LESS than 1 lb. of plastics was used in one of the 1935 model Norge refrigerators; 12 lb. were used in the comparable 1949 model, R849. This expanded use of plastics during the past 15 years reflects the determination of Norge engineers to increase the efficiency of the refrigerators they produce, to improve their appearance, to lighten weight where possible, to eliminate unnecessary and costly manufacturing operations, and to provide the buyer a better product at lower cost.

Reference to Norge models of 1935 vintage shows that plastics applications of that period were quite limited. Phenolic shelf studs had found their way into the cabinet and were doing a good job. Sheet steel relay and condenser covers, black dipped, had given way to molded phenolic, which was more economical and had the added advantage of providing electrical insulation. Phenolic lamp sockets were also in use at that time.

Black phenolic lock bolt inserts for the door latch mechanism were another early plastic application, and in 1935 there appeared a phenolic cold control knob, with indicator arrow wiped-in in white. One of the most ambitious phenolic pieces of the early Norge days was a complete evaporator door.

Among the earliest "appearance" and decorative plastic parts adopted by Norge were nameplates and handles on Coldpacks (meat storage trays) and Hydrovoirs (produce storage trays). Some of these parts were phenolic, but as thermoplastic materials became more firmly estab-

Progress

lished, other nameplates appeared in butyrate—some molded in clear material, with debossed lettering filled in on the reverse side, and others in colors, with name filled in on outer surface.

Then Came Handles

Molded plastic handles and handle inserts were the next Norge plastics application. Urea began to be used in such small parts as cold control knobs and shelf studs, where its availability in white was an advantage.

At least three basic Norge developments involved replacement of substantial amounts of other materials by plastics. These were the plastic throat liner, the phenolic-laminate door liner, and large molded trays or receptacles for meat storage, produce storage, and defrosting water collection.

Early in its history, Norge acquired the Alaska refrigerator plant at Muskegon Heights, Mich., in order to increase its production. Like other iceboxes, the Alaska had been built

This is the story of how, why, and to what extent refrigerator manufacturers have increased their use of plastics over the past 15 years and more.

One maker used less than 1 lb. per unit in 1935, today uses 12 pounds. Another has quadrupled his plastics poundage per unit since 1940. Almost 5,000,000 domestic refrigerators made in 1949 had built into them more than 80,000,000 lb. of plastics.

Better refrigerators with more storage space, lower operating costs, longer life, and less maintenance have resulted from this whole-hearted acceptance of plastics as more efficient materials.

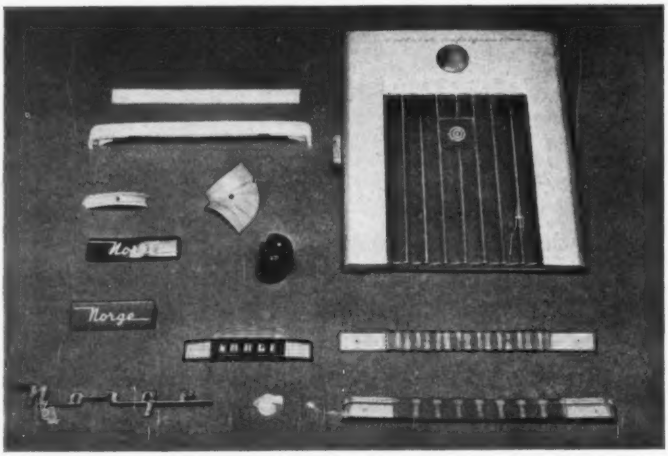
There's another story which runs parallel to this: how the refrigerator makers have affected the technical and market development of the plastics industry. By their enthusiasm for laminated plastic door liners they helped foster improved laminates. Partly through their demands for larger and larger thermoplastic moldings came bigger presses, improved mold making, pin point gating, and better cycling. Extruders of both rigid and elastomeric materials can thank refrigerator makers, too, for many tough specifications.

Typical Plastic Applications Used by Norge

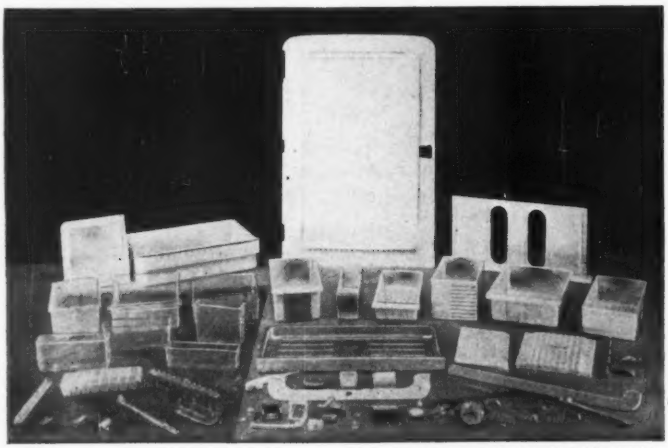
Description of part or component	*Materials used*	*Material replaced*
Throat liner and associated parts:		
Throat liner strips	paper-phenolic laminate & polystyrene	hard maple
Corner moldings	phenolic & styrene	metal
Cold control knob & escutcheon	styrene	metal
Light switch escutcheon	styrene	metal
Provision door, inner liner	paper-base phenolic laminate	porcelain enameled sheet steel
Trays and similar large interior parts:		
Coldpack	polystyrene	glass and metal
Handefroster	polystyrene	glass and metal
Hydrovoir (some models)	polystyrene	metal
Complete drip tray	polystyrene	aluminum
Drip tray front	polystyrene	aluminum
Complete evaporator door	phenolic, butyrate, polystyrene	glass, or porcelained sheet metal
Evaporator door liner	polystyrene	aluminum
Freezer compartment doors (on upright freezer)	polystyrene	aluminum
Electrical parts:		
Lamp sockets	phenolic	porcelain
Relay covers	phenolic	sheet steel
Condenser covers	phenolic	sheet steel
Night Watch harness sleeve	elastomeric vinyl	polyethylene
Night Watch connector plug	phenolic, styrene	rubber
Electric clock terminal shields and plugs	phenolic, urea	rubber
Exterior handles and latch assembly:		
Complete handles	phenolic, polystyrene	plated metal
Handle inserts	polystyrene	metal
Lock bolt inserts	phenolic	metal
Lock bolt rollers	nylon	steel
Lock bolt and lock strike escutcheons	styrene	plated metal stampings
Name plates, interior trim and miscellaneous:		
Three-dimensional name plates	polystyrene	metal
Miscellaneous nameplates, debossed letters	butyrate	metal
Script name castings	butyrate or styrene	die-castings
Tray pulls and fronts	phenolic, butyrate & polystyrene	plated metal
Shelf guards	acetate	miscellaneous
Shelf ladders	polystyrene	"
Shelf studs	phenolic, urea	"
Hydrovoir slides	polystyrene	"
Drip tray baffle	polystyrene	"
Tank hanger blocks	miscellaneous	wood
Ice cube trays	polyethylene	aluminum
Germicidal lamp shields	polystyrene	aluminum
Tank plugs	polystyrene	rubber
Cold control knobs	phenolic, urea, polystyrene	miscellaneous
Evaporator door pulls	phenolic, polystyrene	"
Interior light switch button	phenolic	"

A Refrigerator Engineer Looks at Plastics

"In industry, one has only to look at the economies that have been produced, the efficiencies that have evolved, and the further horizons that have been opened by and from the use of plastics, to become fully aware of the unlimited possibilities of the public acceptance of a product made wholly or partially of these materials. We take some pride in the fact that we were pioneers in the use of plastic resins in refrigeration."—*L. H. Darbyshire, Chief Cabinet Engineer, Norge Division, Borg-Warner Corp.*



1940



PHOTOS COURTESY NORGE DIV., BORG WARNER CORP.

1949

Norge's growing use of plastics is graphically illustrated by the contrast between the few black phenolic parts used around 1935, the slightly larger thermoplastic parts in use around 1940, and the array of parts in 1949 model

largely of wood. One of the principal programs undertaken by Norge was to eliminate wood from its refrigerator, avoiding the many inefficient and costly operations involved in working with this material.

In early Norge models, the throat liner consisted of four strips of hard maple, with molded phenolic pieces concealing the corner joints. In order to eliminate this expensive throat liner construction, Norge in 1941 introduced contoured throat liner strips of phenolic-impregnated paper-base laminate, fabricated by Capac Plastics, Inc., Capac, Mich. They were used first with molded cellulose acetate and later with polystyrene corner pieces. The phenolic laminate breaker strips were continued until 1947; in that year, Norge also used a molded polystyrene cold control knob with an escutcheon recessed into the top throat lining strip.

Norge's first all-polystyrene throat liner, composed of four strips with styrene corner moldings, appeared in 1948. Then the corner pieces were eliminated by molding them integrally with the top and bottom strips, and the top strip was recessed and cored for the cold control knob. This is the throat liner construction now in use by Norge.

Porcelained Steel Replaced

The Norge inner door liner was originally made of porcelain enameled steel. Instead of providing a thermal break, this liner served as a heat conductor, increasing the heat leakage through the door. Breakage was expensive, and the heavier steel door panel required longer fabricating time schedules.

The one-piece paper-base laminate liner, first supplied to Norge by the Panelyte Div., St. Regis Paper Co., was light in weight and could be handled with little fear of damage. The laminate weighed

(Continued on page 249)

A Matter of Taste—and Odor

Vinyl water-cooler gasket, practically indestructible, replaces rubber to advantage of the user

THE switch from rubber to vinyls over the past few years has been steady and has been based on the superior properties of the vinyls in color, heat, cold, chemical resistance, and workability.

For a different reason, Ebco Mfg. Co., Columbus, Ohio, declared to be the world's largest manufacturer of electric drinking water coolers, has switched from a rubber gasket to an extruded, heat-sealed Geon ring which is seated between bottle and cabinet to prevent leakage.

Underlying the switch in this case was the fact that the molded rubber gasket, without ever coming in contact with the water in the cooler, transmitted a rubbery taste and odor to the water. The new plastic gasket, after months of field testing, has imparted no odor, nor has it affected the taste of the water in any way. Costing approximately 13% more than the rubber unit, the vinyl gasket has already proved practically indestructible under accelerated aging tests; as a result, the company will realize economy in not having to provide replacements.

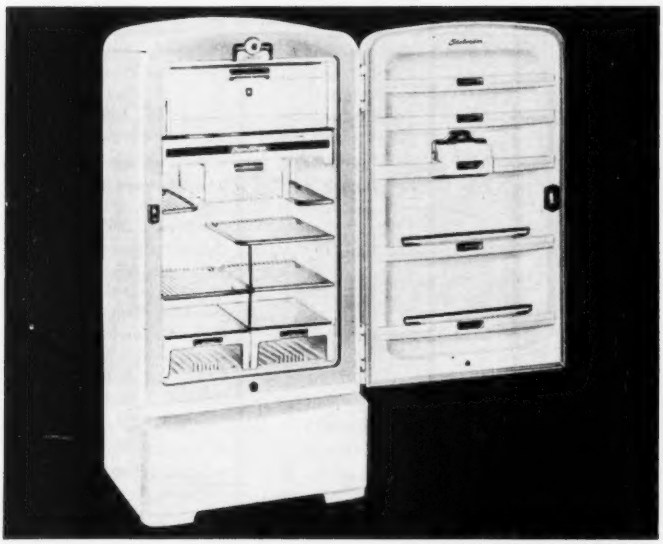
Ebco expects the new gasket to last as long as the cooler itself.

COURTESY B. F. GOODRICH CHEMICAL CO.

Extruded vinyl gasket transmits no taste or odor to water in cooler

68 Parts; 24 Pounds of Plastics

Crosley engineer states that plastics satisfy the requirements for many refrigerator parts better than other materials



COURTESY CROSLEY DIV., AVCO MFG. CORP.

Crosley 1950 Shelvador Model DB-11 has 68 plastic parts. The recessed door shelves, made of metal until this year, are now molded of white polystyrene

WHEN asked to compare the cost of producing the various plastic parts in the 1950 Crosley Shelvador with the cost of producing the parts they replaced, O. E. Norberg, manager of Refrigeration and Appliance Engineering for the Crosley Div., Avco Mfg. Corp., said: "The comparison of plastic parts in the 1950 model with such parts as they may have replaced will show some savings in costs, but these savings are subordinated by the added value which the plastic parts give the rerefrigerator from the standpoints of

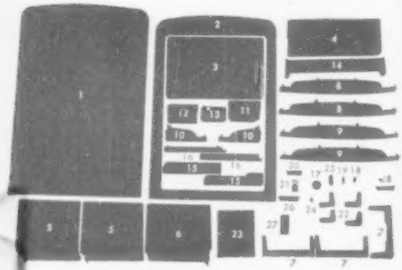
Plastics Materials in Crosley 1950 Shelvador Model DB-11

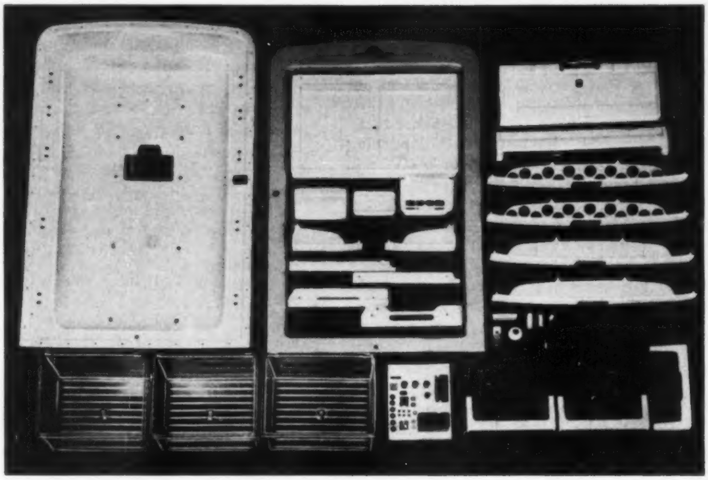
Material	*No. of Pieces*	*Total Weight*
		(lb.)
Polystyrene	31	17.546
Laminated phenolic	27	6.356
Phenolic	3	.123
Acrylic	2	.070
Nylon	3	.020
Cellulose acetate	1	.010
Vinyl	1	.010
	68	24.135

performance and appearance. That is to say, the value of plastics is based more on the fact that these plastic parts, *at no increase in cost*, satisfy the requirements for many refrigerator parts better than other materials."

As examples of what plastics contribute, Mr. Norberg cites freezer compartment doors and crisper trays. In the doors, plastics are ideal because the structural parts themselves act as insulation, thus helping to prevent condensation of moisture and subsequent icing more effectively than metal doors. The clear plastic crispers make it possible to inspect the contents without opening the tray. The plastic trays are quieter than metal or glass, lighter than metal or glass, and more durable than glass.

In the largest refrigerator which (*Continued on page* 112)





All 68 of the plastic parts used in the 1950 model Crosley 11-cu. ft. refrigerator are shown at right. Parts can be identified by reference to the key chart (above) and to the tabular summary of parts and reasons for their use (below)

Plastic Parts Analysis—Crosley 1950 Shelvador Model DB-11

No. on Key Chart	*Name of Part*	*Material*	*No. Required*	*Total Weight (Lb.)*	*Reason for Choice of Plastic*	*Supplier*
1	Door liner	Laminated phenolic	1	6.060	Because of its rigidity and thermal insulating qualities.	Panelyte Div., St. Regis Paper Co., Trenton, N. J.
2	Trim Frame	High-impact polystyrene	1	1.910	To withstand flexing during assembly.	Cambridge Molded Plastics Co., Cambridge, Ohio.
3	Baffle—Evaporator	Polystyrene	1ª	3.790	See Note 1	Cambridge Molded Plastics.
4	Door—Evaporator	Polystyrene	1ª	2.00	See Note 1	The Standard Products Co., Plastics Div., St. Clair, Mich. Cambridge Molded Plastics.
5	Tray—Crisper	Clear polystyrene	2	3.420	See Note 1	General American Transportation Co., Chicago, Ill. Metal Specialties Co., Plastics Div., Richmond, Ind.
6	Tray—Meat Storage	Clear polystyrene	1	1.710	See Note 1	General American Transportation. Cambridge Molded Plastics.
7	Handles	Polystyrene	3	0.440	See Note 1	Cambridge Molded Plastics.
8	Shelvador—Eggs	Polystyrene	2	0.820	See Note 1	Cambridge Molded Plastics.
9	Shelvador—Bottles	Polystyrene	2	1.040	See Note 1	Cambridge Molded Plastics.
10	Shelvador—Dairy	Polystyrene	2	0.420	See Note 1	Cambridge Molded Plastics.
11	Body—Butter Safe	Heat-resistant polystyrene	1	0.240	Because this part is removable for cleaning.	Wolverine Plastics, Inc., Milan, Mich.
12	Door—Butter Safe	Heat-resistant polystyrene	1	0.200	See above	Wolverine Plastics.

Plastic Parts Analysis—Crosley 1950 Shelvador Model DB-11—(Cont.)

No. on Key Chart	Name of Part	Material	No. Required	Total Weight (Lb.)	Reason for Choice of Plastic	Supplier
13	Tray—Butter Safe	Heat-resistant polystyrene	1	0.120	See above	Wolverine Plastics.
14	Door—Storage	Polystyrene	1	0.480	See Note 1	Cambridge Molded Plastics.
15	Support—Baffle	Polystyrene	2	0.570	See Note 1	Cincinnati Advertising Products Co., Cincinnati, Ohio.
16	Support—Crisper	Polystyrene	2	0.300	See Note 1	Cambridge Molded Plastics.
17	Knob—Cold Control	Polystyrene	1	0.030	See Note 1. Plated disk in round chrome assembly.	Plastics Inlays Inc., Summit, N. J.
18	Knob—Butter Safe Control	Cellulose acetate	1	0.010	To permit this knob to cold-flow to the shaft serrations.	Wolverine Plastics.
19	Knob—Air Circulation Control	Polystyrene	1	0.020	See Note 1	Premium Plastics Co., Verona, Ohio.
20	Name Plate	Acrylic	1	0.040	To obtain maximum clarity and sparkle.	Hoosier-Cardinal Corp., Evansville, Ind.
21	Trim—Latch Handle	Acrylic	1	0.030	See above	Kent Plastics Corp., Evansville, Ind.
22	Support—Liner	Laminated phenolic	4	0.180	For its strength and thermal insulating qualities.	Panelyte Div., St. Regis Paper Co.
23	Slide-Evaporator Door Hinge	Nylon	2	0.010	For its low coefficient of friction.	Standard Molding Corp., Dayton, Ohio.
24	Roller—Latch Mechanism	Nylon	1	0.010	See above	Peerless Molded Plastics, Inc., Toledo, Ohio.
25	Spacer—Strike	Polystyrene	1	0.021	See Note 1	Peerless Molded Plastics.
23	Spacer—Liner Mounting	Laminated phenolic	2	0.010	For its strength plus thermal insulating qualities.	Insulation Manufacturers Corp., Chicago, Ill.
26	Locking Strip Terminal	Laminated phenolic	1	0.020	See Note 2	Continental-Diamond Fibre Co., Newark, Del.
23	Collar—Terminal	Laminated phenolic	6	0.010	See Note 2	Continental-Diamond Fibre Co.
23	Washer—Terminal	Laminated phenolic	6	0.015	See Note 2	Continental-Diamond Fibre Co.
23	Cover—Terminal	Polystyrene	3	0.015	See Note 1	Recto Molded Products Inc., Cincinnati, Ohio.
23	Insulator—Thermostat	Laminated phenolic	4	0.025	See Note 2	Formica Co., Cincinnati, Ohio.
23	Insulator—Relay	Laminated phenolic	1	0.025	See Note 2	Delco Products Div., General Motors Corp., Dayton, Ohio.
23	Case—Relay	Phenolic	1	0.115	Because of its electrical insulating qualities plus strength.	Delco Products Div.
23	Plunger—Light Switch	Phenolic	1	0.004	See above	Cutler-Hammer Inc., Milwaukee, Wis.
23	Case—Light Switch	Phenolic	1	0.004	See above	Cutler-Hammer Inc.
23	Insulation—Light Switch	Laminated phenolic	1	0.001	See Note 2	Cutler-Hammer Inc.
27	Spacer—Relay	Laminated phenolic	1	0.010	See Note 2	General Laminated Products, Inc., Chicago, Ill.
28	Sheath—Wiring	Vinyl	1	0.010	Because of its flexibility.	Irvington Varnish & Insulator Co., Irvington, N. J.

Note 1. Polystyrene is generally specified for these uses because of its economy, dimensional stability, clarity, color, surface finish and freedom from odor. Other reasons may be: light weight, thermal and electrical insulating value, low water absorption and resistance to cold flow.
Note 2. Laminated phenolic is generally specified for these uses because of its electrical insulating properties.
[a] Molded in two pieces.

Crosley manufactured in 1941, plastics played a decidedly minor role. Besides the door liner, plastics were used only for knobs, trim and some miscellaneous electrical insulating parts. The largest model in Crosley's 1950 Shelvador line, however, is a different story. There are 68 plastic parts, with a total weight of over 24 pounds.

A complete list of the plastic parts in the 1950 Shelvador model DB-11 is given in the accompanying charts. It is interesting to note that the recessed door shelves which give the Shelvador its name are being made of polystyrene this year. Heretofore, these shelves have been metal.

Sealing In Cold at Low Cost

Polystyrene lids for ice cream cabinets, plus foamed polystyrene, plus vinyl gaskets, reduce costs, improve appearance, boost efficiency

By CHANGING over from metal lids to molded polystyrene lids for its ice cream cabinets, the Kelvinator Div. of Nash-Kelvinator Corp. effected a substantial cost reduction on this component. At the same time, the company obtained such "plus" values as better performance, lighter weight, improved appearance and greater resistance to breakage.

Kelvinator's new ice cream cabinets, used in drug stores, restaurants and similar locations, are made in 2-, 4-, 6-, 8-, and 12-hole models. The 6-hole type houses half a dozen drums of ice cream and has two large and two small lids, hinged for easy accessibility. The two larger lids measure $22\frac{3}{4}$ by $11\frac{3}{8}$ in. in size, and the smaller lids are $11\frac{3}{8}$ in. square. The large sections weigh 43 oz. each, the small ones 28 ounces.

Molded of white modified polystyrene material, the top has a formed metal bottom pan assembled with self-tapping screws. Slabs of Styrofoam form the insulation between the two sections. Each pair of lids includes two U-shaped molded gaskets of elastomeric vinyl material around the lower edge. Unlike rubber, the vinyl gasket will not become hard and lose its sealing efficiency. The gaskets are attached with screws through a retainer plate. Lid knobs are of modified polystyrene with rubber inserts. Each pair of lids is held together by means of rubberized fabric and held in place by aluminum hinge plates.

The assembly which preceded this design consisted of a molded hard rubber frame, aluminum bottom, and stainless steel top. The superior performance of the plastic lid stems from the fact that it has less tendency to sweat in humid weather than the old lid, due to its lower conductivity.

In addition to its substantially reduced cost, lighter weight, and improved efficiency, the polystyrene lid also presents a much more attractive appearance, inasmuch as it can be molded with contours difficult or impossible to achieve with the materials formerly used.

Dow No. 475 high impact Styron is the material used on these new lids, which are controlled-flow gated for maximum strength and appearance and reduction of molding cycle. These parts, as well as the vinyl gasket, are produced by the Nash-Kelvinator plastics plant at Milwaukee, where final assembly of the lids takes place.

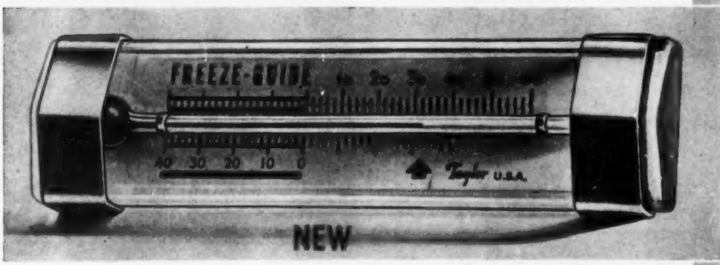
Ice cream cabinet lid (left) is made of polystyrene pieces with slab of foamed polystyrene between them for insulation. Lid also has a vinyl gasket and a polystyrene knob (below). This lid replaces one made with molded hard rubber frame, aluminum bottom, steel top

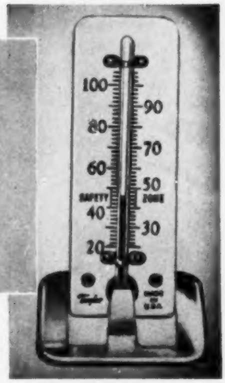
NEW

OLD

Eye Appeal Sells Thermometers

Polystyrene housing protects re-styled refrigerator unit; public acceptance is enthusiastic





OLD

PHOTOS COURTESY TAYLOR INSTRUMENT COS.

Thermometer is more attractive and less fragile in plastic housing

WHEN Taylor Instrument Cos. introduced its new plastic-cased No. 5925 home freezer and refrigerator thermometer, it used a consumer panel of 500 women to pretest the product against a number of other models. The Freeze-Guide, which won this test decisively, has been received enthusiastically since reaching the market recently.

Even though the plastic model has many advantages over its metal predecessor, the Model 5925 is actually lower in production cost. Whereas the old model, of upright design, was easily tipped over and broken, the re-styled Freeze-Guide is designed to hang or rest in a horizontal position, affording increased stability and eye appeal. Breakage is practically eliminated through complete enclosure of the glass tube within the polystyrene housing.

The plastic tube housing also assures average temperature readings, since the thermometer is not affected by momentary door openings. Combination of the plastic case with stainless steel hangers and enameled aluminum scale produces an attractive, rustproof, economical instrument that will give years of dependable service.

The Freeze-Guide housing is molded by Michigan Molded Plastics, Inc., Dexter, Mich., using Koppers polystyrene.

Lock Now Needs No Oil

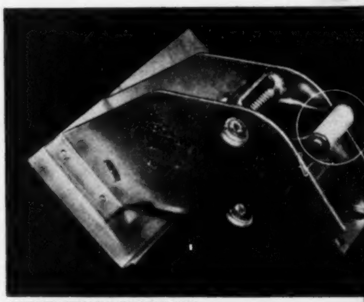
Over 300,000 nylon bolt rollers in refrigerator door locks have proved their excellent wearing qualities

THE lock mechanisms on refrigerator doors are subject to greater punishment than those of almost any other doors. One of the largest manufacturers of refrigerator lock mechanisms, Winters & Crampton Corp., Grandville, Mich., traditionally used stainless steel for the bolt rollers in its patented Roll-O-Grip lock. The main objection to the metallic bolt roller was the fact that excessive wear developed between the roller and the bolt roller pin unless a sufficient amount of lubricant was present at all times. It was difficult to lubricate the roller at time of assembly with sufficient lubricant to last for the normal service life of the door lock unit.

So Winters & Crampton tested molded nylon for bolt rollers and found that it was unnecessary to use any lubricant between the nylon bolt roller and the pin. A fatigue test of 500,000 cycles of opening and closing showed that the plastic rollers suffered practically no wear.

In addition to overcoming the problems of lubrication and wear, the nylon rollers cost from 15 to 35% less than stainless steel rollers, depending upon size.

Now standard with the company, over 300,000 nylon bolt rollers have been used in this mechanism to date.



COURTESY WINTERS & CRAMPTON CORP.

Nylon bolt roller (in circle) outwears steel, needs no lubrication

PLASTICS BUILD BETTER PRODUCTS AND BETTER VALUES

TELEPHONES

Four

ALL PHOTOS COURTESY BELL TELEPHONE LABORATORIES

First handset-type desk set (top) had aluminum alloy base and phenolic handset. Base of first combined set (1937 model) was die cast until 1941, subsequently injection molded. New 500-type set (above and right) has butyrate housing and number plate and phenolic handset, is more efficient

ONE of the most familiar, and therefore least often noticed, uses of plastics is in the telephone set. There are about 40 million telephone sets in the country, and Western Electric Co. is now using over four million pounds of plastic molding powder a year to produce new sets. These new sets bear little resemblance to the upright telephone which was in general use 25 years ago. The telephone has undergone a process of constant evolution—and as it evolved, the use of plastics constantly increased.

The latest development is the 500-type telephone announced by Bell Telephone Laboratories early in 1949. This model is in the final stages of development and several thousand sets were installed on a trial basis during that year. The new experimental set features a completely redesigned housing, an improved dial, a lighter-weight handset, a volume control for the ringer, and better hearing and speaking qualities. Plastic parts in the new phone are made of cellulose acetate butyrate, phenolic, polystyrene, cellulose acetate, nylon, and a styrene-base copolymer.

Handset-Type Desk Sets

The new 500-type set is the latest model of the handset-type instrument (a set in which the receiver and transmitter are a single unit,

Million Pounds a Year!

That's how much plastics now go into the housings, handsets, and smaller parts of Western Electric telephones. The story of the telephone is a progress story of plastics

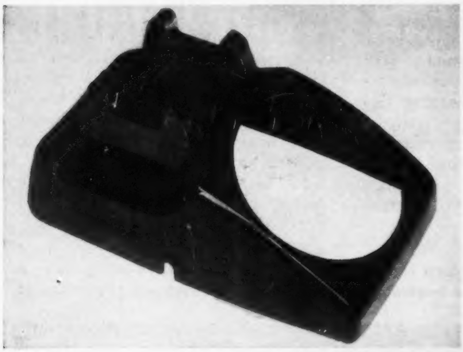
known as the "handset," which rests in a horizontal position on the phone base). The first such set, initially installed in 1925, had a round base made of an aluminum alloy and a handset compression molded of phenolic. This model was standard for more than 10 years.

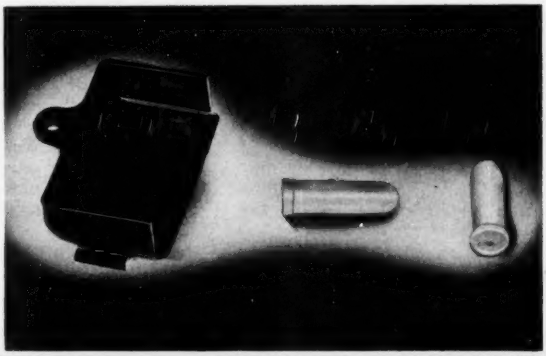
The first combined set was produced in 1937. This model contained all the necessary working parts in its rectangular base and eliminated the need for a bell box on the wall. The handset was redesigned, but phenolic was again specified for this part. The base housing, at first, was a metal die casting, but a few years later Bell Laboratories began to experiment with thermoplastics to replace the die-cast metal housing.

The design of the housing remained virtually unchanged when Western Electric began to produce the housings by injection molding in 1941. The plastic housings were lighter in weight than the metal ones and had integral color which could not chip or peel. Because of the design of the handset, injection molding was considered to be impractical as a method of producing the piece, and phenolic continued to be used.

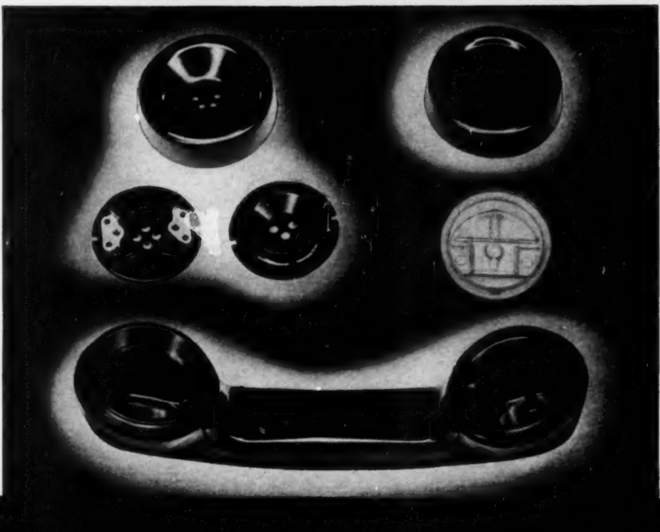
Before switching to plastic housings, Bell Laboratories conducted exhaustive tests of all available injection molding materials. The final choice was cellulose acetate butyrate, which proved to have satisfactory resistance to humidity changes without excessive shrinkage, sufficient impact strength, and the necessary retention of surface finish under hard usage. Ethyl cellulose and cellulose propionate were specified as alternate materials when it proves economical to use them or when the supply situation renders an alternate material desirable. Cellulose propionate has accordingly been used to some extent. Cellulose acetate is used to produce colored sets, which were discontinued during the war, but are now becoming available again in some areas.

As these changes were being made and plastics were being used

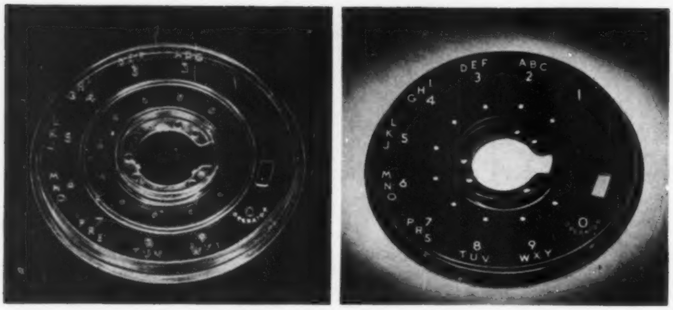




Butyrate housing of 500-type set is lower, longer, and wider than 1937 model, has a less angular appearance. Separate piece (at left in photo at right above) closes off slot in back of housing to form the recess which serves as a carrying handle. Plungers (above, right) on which handset rests are of clear polystyrene



Handset of 500-type set has phenolic main piece, screw-on caps, and terminal plate and back plate in receiver end. Transmitter unit has terminal cup molded of transparent styrene base copolymer



Number plate (right) comes from mold as a transparent butyrate piece with characters molded-in to under side (left). Piece is painted after molding

to improve the telephone set, Bell engineers knew that they were not using plastics to their full advantage and that they could not do so as long as they used plastic materials and a die-casting design. For example, the working apparatus was mounted on the housing rather than on the metal sub-base to which the housing was attached. This method of mounting was perfectly satisfactory as long as the housing was die-cast metal, but it necessitated molded-in metal inserts, and in the thermoplastic housings the weight of the apparatus often caused cold flow, but fortunately not enough flow to be serious.

Complete Redesign

The 500-type telephone announced early in 1949 is the first set designed from the ground up with a plastic material in mind for the housing. One of the early specifications for the designers was that there was to be a plastic housing which would be a simple cover for the apparatus. All internal parts were to be mounted on the metal sub-base.

The final design embodied this feature and other improvements. The dial finger wheel is flush with the housing instead of projecting above it and the numbers are outside the finger wheel instead of under it. The base is lower, longer, and wider than the 1937 design, and much less angular in appearance. Henry Dreyfuss was assigned to plan the appearance design, as distinguished from the engineering design, of the set.

The housing of the new set is molded of black cellulose acetate butyrate, with cellulose propionate specified as an alternate material. At present, while the set is still in the experimental stage, the piece is being molded in a single-cavity die on either a 16-oz. HPM or Lester injection molding machine. The shot weighs 8¾ oz., and the housing weighs 7½ oz. after the flash and sprue have been removed.

The recess in the back of the housing which serves as a carrying handle would normally necessitate sliding cores in the die. To avoid this, a hole is molded right through the back of the main housing piece and a separate molded piece is later screwed in place to transform the hole into a recess to serve as a handhold.

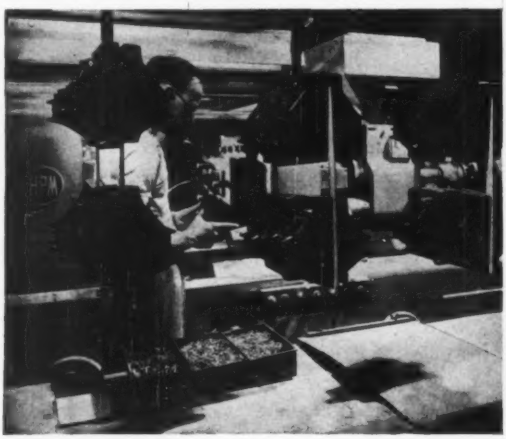
Butyrate Number Wheel

The number plate around the dial is molded of transparent butyrate with depressed numbers and letters molded into the under side. After molding, the back surface is painted black, leaving the depressed characters clear. White is then sprayed into these clear areas. The entire back surface is then sprayed with black. This method of production gives more durable characters than would result if depressed numbers and letters were molded into the top surface, where they might encounter hard wear.

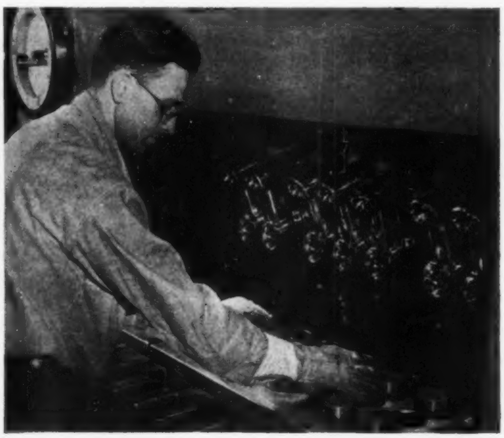
The only other plastic parts in the base which are visible to the telephone user are the plungers on which the handset rests to break the connection when the user hangs up. These plungers are molded of transparent polystyrene.

Inside the base, there are seven

(Continued on page 251)



Housings for 1937 model telephone set are injection molded at the rate of one a minute in Western Electric's Hawthorne works



Handsets for same model are molded in seven-cavity die on a three minute cycle. The preforms are electronically preheated

PLASTICS BUILD BETTER PRODUCTS AND BETTER VALUES

INDUSTRIAL USES

COURTESY BAKELITE CORP.

Ice cream pop vending machine has 16 internal phenolic parts. Top of door is formed of translucent acrylic, has "Serve Yourself" silk-screened on it

Saving $313.12 Per Machine

Molded phenolic parts replace aluminum and bronze in ice cream vending machine; acrylic sheet replaces metal

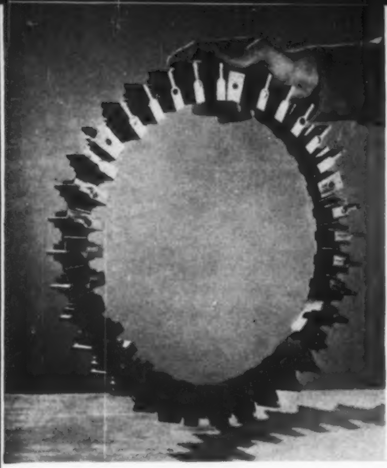
CAN the use of plastics as machinery components really effect substantial cost savings? One of the clearest affirmative answers to that question is the Kenro ice cream pop vending machine. The use of eight phenolic parts in place of metal in that machine resulted in a saving of $313.12 per machine! Without that saving, the machine could not have been produced economically enough to be sold.

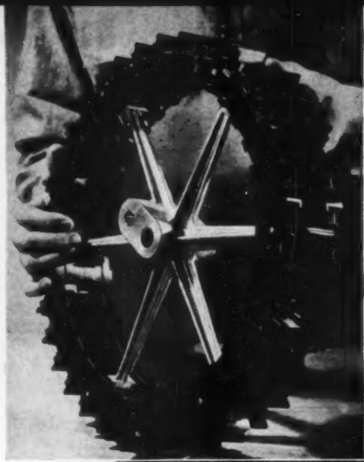
The Kenro machine, made by Eastern Engineering & Sales, Inc., Philadelphia, Pa., dispenses ice cream on a stick, makes change, and stores an extra supply of pops in a compartment held at a temperature between —3 and +5° F. It is the first ice cream pop vending machine on the market and is distributed through ice cream manufacturers and distributors.

Ring Costs Cut $38

The most important application of plastics in the Kenro machine is in the ring-like dispensing units. There are four ring units in the machine, each of which is made up of two Bakelite phenolic rings assembled to a central spider. The rings are intricate in design and measure 15¾ in. in diameter.

Originally, aluminum was used as the material for the rings. But the

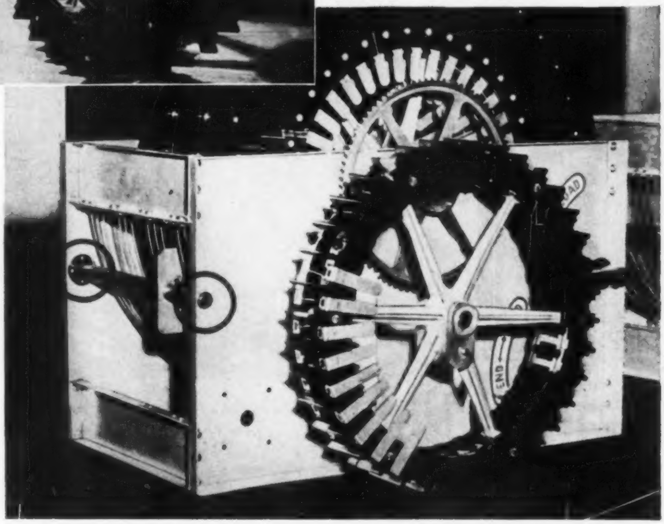




Phenolic ring (far left) for ice cream vending machine is molded for $38 less than the cost of making an aluminum ring. Two rings are assembled on a spider to make a ring unit (left). There are four such units per machine

Mechanism of vending machine contains eight phenolic bushings. Two are circled in photo below

PHOTOS COURTESY BAKELITE CORP.



manufacturer discovered that each ring could be molded of phenolic in one piece, complete with all bosses, mounting holes, and partitions—at a saving of $38 per ring! With eight rings in the machine, that meant a cost reduction of $304 per machine. The plastic part was designed and engineered in cooperation with Plastic Fabricators, Inc., Lansdale, Pa., which is now molding the rings.

In addition to their cost advantage, the phenolic parts reduce the weight of the machine, thereby reducing shipping costs. Each phenolic ring weighs 2 lb.; the complete phenolic unit weighs 87 lb. as against 117 lb. for the aluminum unit.

Cost of Bushings Cut 95%

An additional cost reduction was effected by the use of Bakelite phenolic instead of bronze for eight bushings in the Kenro machine. There are four bushings with ⅝-in. holes, two with ½-in. holes, and two with ¾-in. holes. These bushings were originally made of bronze at a cost of $1.20 each, or a total of $9.60 per machine. They are now molded of Bakelite phenolic at a cost of 6¢ each, or 48¢ per machine. This is only 5% of the cost of the bronze bushings. The $9.12 saved on the bushings, added to the saving on the phenolic rings, makes a total of $313.12 saved per machine by using phenolic instead of metal.

Acrylic Cuts Tooling Costs

Another saving was made by the use of acrylic sheet instead of metal for the curved top of the front door of the Kenro machine. The dispenser was redesigned when it was discovered that tooling-up for a curved metal part would cost almost $7000. The tooling costs for producing the same part of acrylic were only $150. In addition, the translucent Plexiglas part can be lighted from the inside to add display value to decorative lettering silk screened on the outer surface.

The door top is 34 in. long, 5 in. deep, and 4 in. high at the center. It is formed of translucent red Plexiglas 0.187 in. thick by Amplex Mfg. Co., Philadelphia.

Costs Cut on a Scythe

Tooling for power scythe housing of polyester-glass mat cost only 15% of that required for stamping metal

FOR short-run, big-piece jobs, tooling costs are invariably a major consideration. Such costs faced the Jacobsen Mfg. Co., Racine, Wis., in planning a motor housing for a 36-in. power scythe. Being a new and specialized item, only a small number of the scythes would be produced. Yet the design had to be such that longer runs could be produced later in other materials, should a change-over be desired.

Brooks Stevens Associates, Milwaukee, Wis., industrial designer, developed a one-piece design suitable for production in molded reinforced plastics or cast aluminum. The tooling for this design cost only 15% of the tooling for stamped steel. Up to 1000 units can be eco-

Power scythe has housing made of glass mat and polyester resin, enameled to match rest of machine

nomically produced in glass mat and polyester resin; above that quantity aluminum would take over, and in really large runs steel would be cheapest.

The plastic housing, which is preformed from random cut Fiberglas impregnated with Selectron 5003 resin, is molded by Tubular Weaving Co., Columbus, O., in aluminum male and female molds.

The unit has stood up under the severest tests and in field use where its life is rugged and strenuous. It is completely weather-proof and resilient enough to take shocks. In service, the housing is enameled to match the rest of the product.

Over a quarter a century ago, the first phenolic laminate gears were put to use and the first molded machine components were created; since then, applications of plastics in capital equipment have become increasingly important.

The high speeds of modern machinery, the terrific cost of down-time today, the economics of component replacement, and the necessity for eliminating lubrication and other maintenance services where possible, have opened the whole industrial field to new plastics materials and methods of using them.

In some of the case histories here presented, plastics were used to lower machine part costs.

Still other case histories prove up the economics of using plastics which may have material costs much higher than the metal or other material replaced by the plastics. In these cases the end result of the use of the plastic is a drastic cut in operating, replacement, or maintenance costs!

Laminate Replaces Cast Iron

Higher cost of new bearing surfaces for heavy machine tools more than offset by advantages of longer life and heat insulating qualities

COURTESY FORMICA CO.

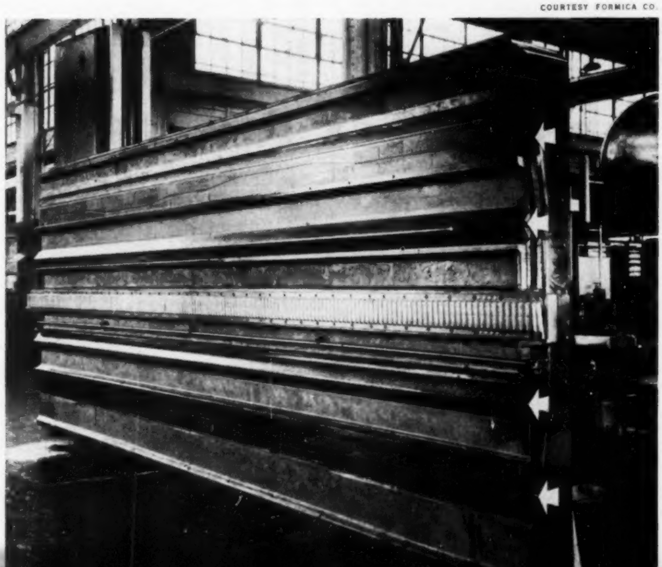


Table ways and bearing surfaces (indicated by arrows) of 175-ton planer are surfaced with phenolic laminate which outwears cast iron

ONCE upon a time the expression "wear like iron" was an effective way of saying that something had extremely high wearing qualities. But plastics have destroyed the force of that expression by proving that they can, on occasion, wear far longer than iron. A good example is the use of phenolic laminate bearing surfaces instead of cast iron in heavy machine tools made by G. A. Gray Co., Cincinnati, Ohio.

One of Gray's recent products is an 8-in. planer-type horizontal boring, drilling, and milling machine which weighs 175 tons. This machine, despite its huge size, is rated as

one of the most accurate machines available for finishing flat surfaces.

The ultimate operating accuracy of the planer depends in large measure upon the ways which guide the table. One of the problems encountered in this machine is the wear and deterioration, and consequent loss of accuracy, which results from the constant reciprocal motion of the ways.

Until recently, cast iron was used exclusively for the bearing surfaces of Gray planers. When one side of a bearing surface was replaced with Formica high pressure phenolic laminate, greater accuracy and longer bearing life were the immediate result.

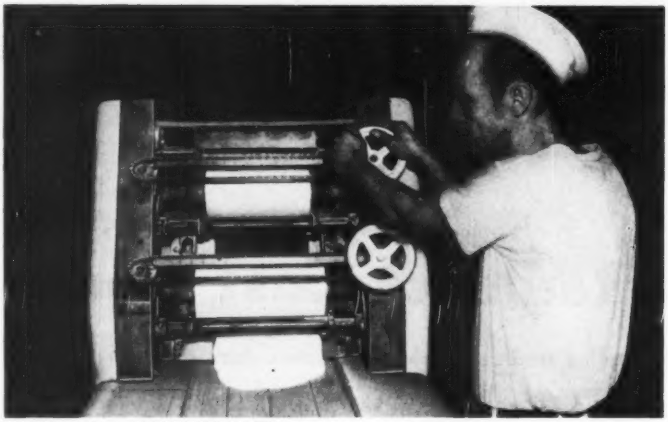
Advantages Gained

The Formica cast-iron bearing had three important advantages: 1) Formica insulates the table against the heat generated by high speed reciprocation, thus preventing the table from curling or distorting; 2) The laminate bearing surface eliminates scoring and scratching of the main guide ways; and 3) The Formica surfaces can carry much heavier loads than cast iron.

The Formica cast-iron bearing surfaces cost more than the all-iron ways. But the advantages of the laminate bearings outweigh the cost considerations. The proof that Gray's customers think so is the fact that the Formica bearing surfaces are offered as optional equipment—and few planers are sold without them.

Saving 'Dough' in Bread Dough

Because bread dough will not stick to tetrafluoroethylene, bakers save time by using dough rolls covered with the plastic



COURTESY E. I. DU PONT DE NEMOURS & CO., INC.

Bread-molding machine has rolls covered with ½-in. thick Teflon to prevent dough from sticking. No dusting flour is needed, and $20 per day is saved

BREAD dough is sticky stuff. In conventional bread-molding machines, the stainless steel rolls have to be dusted frequently with flour to prevent sticking and to keep shutdowns for cleaning to a minimum.

But as sticky as bread dough is, it will not stick to Teflon (tetrafluoroethylene). Stickelber & Sons, Inc., Kansas City, Mo., is therefore using ½ in.-thick Teflon to cover bread-molding machine rolls. The result, according to Manbeck Baking Co., Hagerstown, Md., is a saving of $20 per day per machine by the elimination of dusting flour.

In addition to this saving, the performance of the Teflon-covered rolls is better. Thinner sheets can be rolled without tearing the dough, and the product is more uniform because there are no cores or flour rings in the baked loaf.

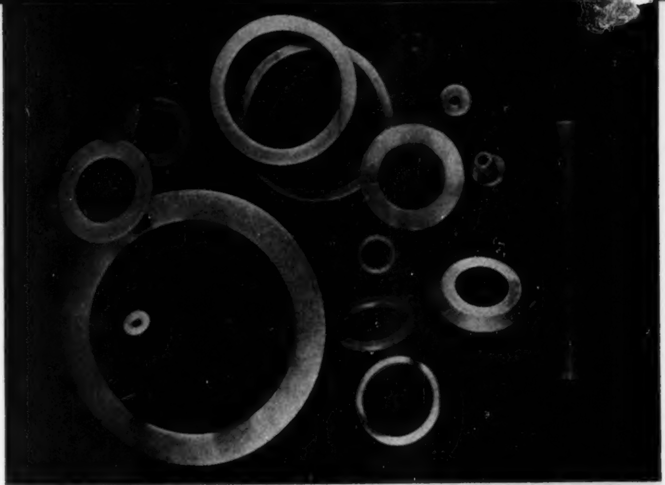
Price is Higher, Cost is Lower

Gaskets of plastic material have such high wear- and chemical-resisting qualities that service life may be 365 times greater than that of conventional gaskets

THE price is up to 10 times as much as conventional materials—but it lasts up to 365 times as long! That, in brief, is the success story of Teflon (tetrafluoroethylene) as a material for gaskets and packing in the chemical industry.

Power Products Co., New York, N. Y., makes gaskets of pure Teflon, of shredded Teflon combined with a friction reducer such as mica or graphite, and of conventional packing materials jacketed with Teflon. The company advertises that "NO chemical can attack Teflon packing."

One of the Teflon-jacketed gaskets with asbestos inserts was installed in a Pfaudler kettle at Ciba Pharmaceutical Products, Inc., and was in service for a year against acetic acid and/or carbon tetrachloride. It was then removed for examination—and was found still serviceable! The standard blue asbestos



Gaskets, packing, and special parts of various types are made of Teflon (tetrafluoroethylene), mainly because of chemical resistance

COURTESY POWER PRODUCTS CO.

gasket formerly used in the application lasted about 2 to 4 weeks.

The Teflon-jacketed gasket cost $2 whereas the asbestos gasket cost only 50¢. But the annual cost for the joint (even when figured on the basis of the maximum life of one month for the asbestos and the conservative estimate of one year for the Teflon) is $6 for asbestos gaskets and $2 for Teflon.

An even more striking example of the savings which are possible because of the high chemical resistance of Teflon is the experience of Koppers Co. with Worthite pumps which handle fuming sulfuric acid. When conventional packing was used, the pumps had to be repacked every 2 days. This meant a continuing expense for ne˜ sets of gaskets, and additional losses because of shut down and cost of installation each time the packing was replaced.

In December 1947, the pumps were packed with Teflon rings and spacers manufactured by Power Products. The five rings and seven spacers needed for each pump cost $11.47 per set in Teflon as against about $1.10 per set for conventional packing. But the Teflon packing lasts two years. As a result the cost per pump per month over the two-year period was only 48¢ with Teflon—as against $14.30 with conventional packing.

The Economics of Teflon Packing

Case #1: Ciba Pharmaceutical installation of Teflon-jacketed gasket against acetic acid and carbon tetrachloride

	Conventional packing	*Teflon packing*
Cost per gasket	50¢	$2.00
Average service life of gasket	1 month	over 1 year
Cost for gaskets per year	$6.00*	$2.00

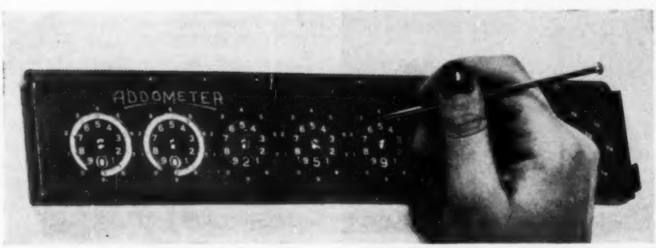
Case #2: Koppers Co. pump handling fuming sulfuric acid

Cost per set of gaskets	$1.10	$11.47
Service life of each set	2 days	2 years
Cost for gaskets per month averaged over two years	$14.30*	48¢

* Not including loss through shut down and cost of installation when gasket or packing is replaced.

Urea + Nylon = Economy

Urea gears and nylon star wheels in portable adding machine improve operation and save assembly cost

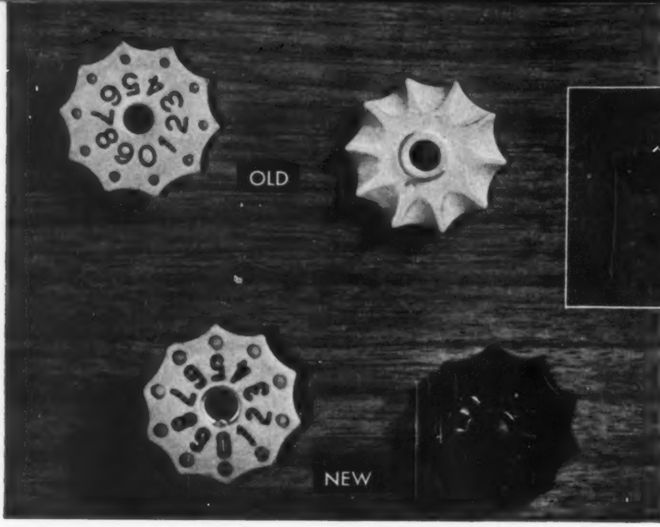


COURTESY CHICAGO MOLDED PRODUCTS CORP.

Portable adding machine has urea dial wheels with molded-in gears and nylon star wheels which transmit motion from one dial to another at proper interval

ASSEMBLY time and production costs have been cut by the use of molded plastics for the number wheels and star wheels in the Addometer, a portable eight-column adding machine manufactured by Reliable Typewriter & Adding Machine Co., Chicago, Ill.

The Addometer measures only 11½ by 2½ in., but it can be used for addition, multiplication, or direct subtraction. The face of the machine is made up of eight dials, each of which has figures on the inside for adding and smaller figures



PHOTOS COURTESY CHICAGO MOLDED PRODUCTS CORP.

Above: Old star wheel was a steel stamping with brass bushing. One-piece nylon star wheel works more smoothly, costs only half as much

Left: Old cellulose nitrate dial wheel had to be assembled to metal gear. Urea wheel with molded-in gear eliminates eight operations

on the outside for direct subtracting. A stylus carried within the machine is used for turning the dial wheels, and the answers show through a window directly below the center of each dial. A clearing lever on the right side of the machine is used to reset all the dial wheels to zero before starting a problem.

Assembly Operations Eliminated

Originally, the dial wheels were made of cellulose nitrate. But the gear for resetting each wheel was made of metal. Assembling the gear to the wheel so that the two functioned as one unit necessitated inserting the bushing and keying the wheel to the gear. Eight separate operations were required for each wheel—or a total of 64 operations for each Addometer.

In an attempt to eliminate these time-consuming assembly operations, the manufacturer took the problem to Chicago Molded Products Corp., Chicago, Ill. The molder's solution was simple: mold the number wheel of urea and mold the gear as an integral part of the wheel. This recommendation was adopted with a consequent saving of 20 min. of labor and shop time on each machine. The face of the new dial wheel is identical to that of the original. The molded-in gear not only eliminates the assembly operations, but ends the danger that the gear might slip and thus get out of adjustment with the wheel.

Plastics are also used in the Addometer to cut the cost of producing the star wheels which transmit motion from one dial to the next at proper intervals. These star wheels were originally made of steel stampings which had brass bushings inserted to serve as center bearings. In place of this two-piece metal assembly, the Addometer now uses one-piece nylon wheels molded by Chicago Molded Products Corp.

Nylon Wheels Cut Costs

The nylon star wheels require no lubrication, work more smoothly than the metal wheels, and are less noisy. Their cost of production? About 50% of the cost of the steel-and-brass star wheels.

Laminates for Jigs in Britain

Virtually undeveloped in the U. S., this industrial application is being rapidly accepted in England

COURTESY BAKELITE, LTD.

Drilling jig made of phenolic laminate weighs 1/6 as much as steel

JIGS and tools made of plastic laminates are not yet in wide use in this country. The low pressure laminates have been used in the aircraft industry and laminators themselves customarily use their own materials for making jigs and fixtures. But additional developments along these lines have been slow when compared with developments in England, where jigs and tools

machined from high-pressure phenolic laminates are used in many industries.

The laminated phenolic material made by Bakelite, Ltd., London, can easily be fabricated using standard machining techniques. It can be drilled, turned, tapped, or sawed. It can even be machined with ordinary woodworking tools. This enables furniture manufacturers and other woodworking plants to make their own jigs, and has been an important factor in the acceptance of laminated material in the industry.

In applications where large jigs have to be handled by women operators, the light weight of Bakelite laminated is an important advantage. It weighs about one-sixth as much as mild steel. The material is more expensive than wood, initially. But it is much tougher and will wear much longer than wood.

Cleans Cleaner, Wears Longer

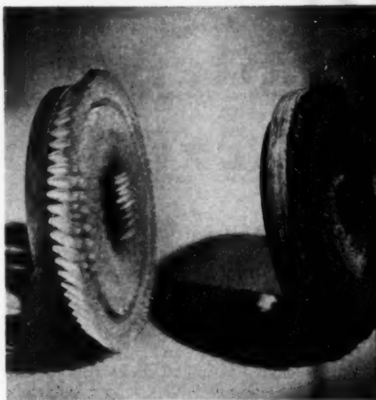
Nylon bristles do such a superior job that most rug-scrubbing brushes now use them in place of fiber bristles

MOST rug-scrubbing brushes are now bristled with nylon. The reason is clearly pointed out in the cost figures (see accompanying table) furnished by Wade, Wenger & Associates, Chicago, Ill. In its on-location rug cleaning business, this company has discovered that nylon-bristled brushes last so much longer in service than fiber-bristled brushes that the company's expenditures for brushes is reduced 80%—even though one nylon-bristled brush costs roughly three times as much as one fiber-bristled brush.

In addition to the cost saving, the stiffer nylon bristles do a better cleaning job. They do not soften, won't pack with nap, won't tear the carpet, and can be cleaned easily by flushing instead of soaking overnight.

Nylon v. Fiber Bristles in Rug Scrubbing

	Service life of brush (running hours)	*Cost per brush*	*Number of brushes needed for 2100 hours of use*	*Total cost of brushes for 2100 hours of use*
Nylon	2100	$29.00	1	$29
Fiber	105	$ 7.50	20	$150



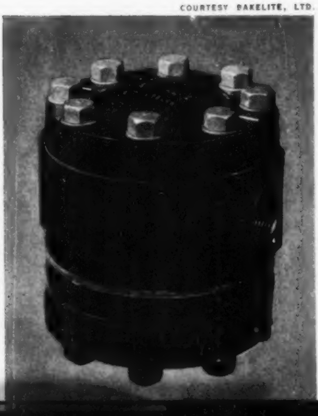
COURTESY E. I. DU PONT DE NEMOURS & CO., INC.

Nylon-bristled rug scrubbing brush (left) has seen more service than fiber brush, is still in better condition. Nylon brush costs less in the long run, does a better job

24 Man-Hours Saved by Molding

Molded phenolic instead of metal parts in water valve cut costs by reducing machining time

COURTESY BAKELITE, LTD.



Phenolic water valve is produced for $11.20 less than one made of metal

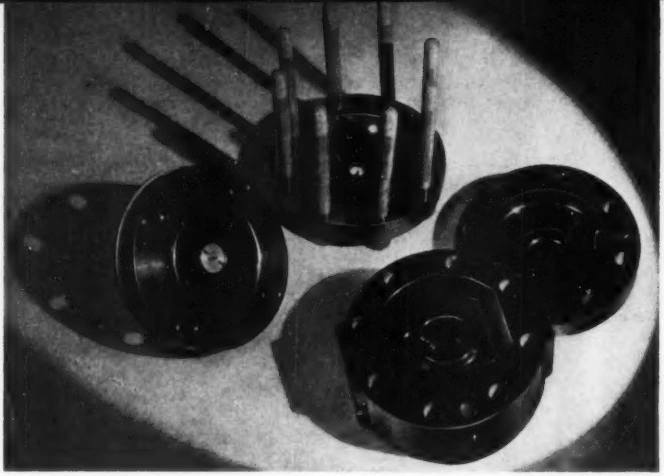
THE water valve in the air compressors made by Reavell & Co., Ipswich, England, was once built up from a number of gunmetal castings. In an effort to cut production costs, the manufacturer recently redesigned the pneumatic water valve so that it could be made of phenolic.

The housing of the valve has an overall diameter of 4¾ in. and is 5½ in. deep. It is made up of four parts molded of a water-resistant grade of phenolic molding material supplied by Bakelite, Ltd., London. The parts are compression

molded by Litholite Insulators & St. Albans Mouldings Ltd., Watford. Heavy metal inserts which are necessary to take large diameter feed pipes are molded-in. The adoption of the plastic housing in place of metal eliminated 24 man-hours of machining time.

The result: a saving of £4 ($11.20) per valve.

Phenolic water valve is molded in four parts, assembled with metal bolts. Housing is 4¾ in. in diameter, has a depth of 5½ inches



COURTESY BAKELITE, LTD.

Enter Polyethylene—Exit Holland Cloth

Sticky rubber surfaces, once protected by cotton fabric, now covered by plastic film

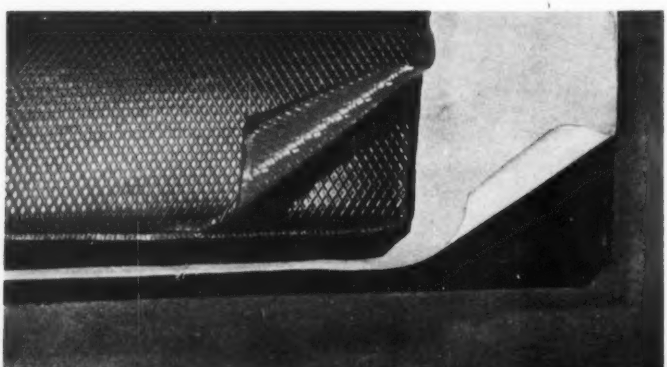
A FABULOUS field for extruded polyethylene film has opened up during the past year in a strictly functional application: the replacement of Holland cloth by embossed polyethylene film as a base sheet to preserve tack and to prevent dust from collecting on sticky rubber surfaces in camel-back repair materials, unvulcanized rubber, patch material, and mechanical goods. The new material, as made by Plax Corp., Hartford, Conn., is a 4-mil film embossed to a diamond or square pattern 6 mil thick, plus or minus 1 mil. The material it replaced was a cotton fabric starch-filled and calendered to a gloss.

Basic reason for the change was a desire for economy which would not effect quality. The application has been so satisfactory that today, less than three years after the birth of the idea, it is estimated that 85 to 90% of the rubber industry is using polyethylene in preference to Holland cloth. The savings are substantial: polyethylene, colored and embossed, averages $.83 per lb. against the cloth price of $1.18 per lb.; this 30% saving is further increased because polyethylene yields 5.2 yd. per lb. against 3.2 yd. per lb. of the cloth. Thus, at 16¢ per yd. for the film and 37¢ per yd. for Holland cloth, the gross saving amounts to 60%. However, the slightly slower production and somewhat higher scrap with the film, as well as some additional handling costs, cut the net saving to a little over 30%, according to some manufacturers. Others report no difference in production rate or waste, and a net saving of 55%.

The change-over involved many problems. Because of the greater stretch of polyethylene, new winding techniques were developed. Embossing at the extruder head created a problem because closer tolerances in the film were required than had been acceptable up to the introduction of it into this field. With the first samples produced, the rubber industry found it necessary to recompound materials because the polyethylene didn't preserve the tack adequately. Improved film making and proper embossing design helped to overcome this problem and reduced the tendency of the covering to entrap air.

Advantages have been many. The stripping time has been reduced. The polyethylene is unaffected by high humidity conditions which cause the Holland cloth to absorb moisture, loosening the sizing in it and ruining the rubber product.

Almost 120,000,000 lb. of rubber are produced per year which use protective film and some 15 lb. of film are needed per 1000 lb. of rubber. Based on the conversion of 85% of the industry, this means that 1,500,000 lb. of polyethylene film are going into this one application.



Polyethylene film embossed in pattern replaces Holland cloth

PLASTICS BUILD BETTER PRODUCTS AND BETTER VALUES

FURNISHINGS

Fabulous Future for Vinyl Drapes

The market is wide open for drapes which have none of the shortcomings of fabric and paper materials

THE RELATIVELY new use of vinyl-chloride acetate and vinyl chloride in the manufacture of printed window-drape material has been one of the big developments of the past year. With over 42 million home units in the United States having at least 10 windows per unit, and with each window requiring an average of 2½ yds. of material, it would take 1,050,000,000 yds. of drapes to outfit the nation's windows. Again on an average, drapes are replaced every two years so that the total annual market under normal circumstances could be 500 million yards.

This market has been shared in the last three years by fabric and paper drapes. But the lowest-priced cotton drape available costs around $2.00 per window; at that price it would be of pretty sleazy material and not well printed. Moreover the cost and bother of its upkeep in cleaning and pressing must be considered. Paper drapes today sell as low as 79¢ per window, and for that the customer gets a flame resistant product, the life of which is only a matter of months, and the cleaning of which is difficult. Higher-priced paper drapes may be had that will not look cheap, but in the lower brackets there is no mistaking them.

Into this field came the vinyls, materials with fine "hand," softness of drape, stability, and beauty. And they were immediately available in so many gages and different plasticizations that they have already taken over the market formerly held by higher-priced paper drapes as well as that formerly held by cloth drapes selling at below $5.00 per window. The vinyl drape not only looks well; it can be cleaned easily, and it will not fade. And the mate-

Vinyl bedspreads and matching drapes, as made by Susquehanna Mills, Inc., N. Y.

COURTESY BAKELITE CORP.

Vinyl drapes (right), as made by Toscony Fabrics, Inc., N. Y.

Plastics have entered American homes as decorative elements to a much greater extent than the average householder realizes. The vinyls, of course, lead the parade. They have replaced leather in upholstery, are making big inroads on fabric and paper drapes, and are gaining wide acceptance as superior flooring materials in competition with linoleum and rubber tile.

It is impossible to establish any broad economic picture of this competition. First, the vinyls are so fabricated in all these fields as to compete in a wide variety of price and quality ranges; second, the vinyls are so new to the fields that use proof of long life is not available, but accelerated tests prove the plastics superior to competition in any price range.

The decorative laminates have now become standard in kitchen work surfaces and are moving into the bathroom, into home bars, coffee tables, and bed room furniture tops. Cellulose acetate, the vinyls, and now polyethylene, have cut a wide swath through the paper and fabric market in lamp shades. Here cost is secondary to the far more important factors of beauty, durability, and cleanability of the plastics materials.

Hidden but important elements in the home decoration and furnishings picture are the resins used in paints and finishes: the phenolics, the caseins, the alkyds, the vinyls, and now the polystyrene emulsions. Hidden also are the plastics resins used as adhesives in furniture manufacture where electronic curing and room temperature setting adhesives have made better furniture at lower cost.

Polystyrene wall tile, now standardized in quality, has gained a huge market, replacing ceramic and metal tile at lower cost in bathrooms and kitchens. Plastics in wall coverings, whether sheet material or coatings on decorated cloth and paper, have also found wide acceptance.

The use of the acrylics in home furnishings has become specialized in decorative pieces such as lamp bases, but has provided effects obtainable in no other way. The commercial applications of plastics in hotels, restaurants, railroad cars, etc., have in many cases provided the punishing use tests so necessary to the later development of sales in private homes.

rial is resistant to mildew, flame, cracking, and stain.

The more or less standard grades range from $3.98 retail in 4-mil material with the finest of printing and design, through 3 mil (generally metallic) selling at around $1.98, down to cast 2-mil film which has been marketed as drapes at as low as $1.39.

There are some eight manufacturers of drapery materials and at least 40 makers of finished drapes from this material. Three of the largest operators in the paper drape field have now gone into vinyl.

The plastic proved better. And since surveys show that more than 70% of all windows have no hangings of any kind, the future of vinyl drapes is obviously fabulous.

Superior to All Competition

Vinyl window shades retail at lower price than cloth shades; are outstanding in physical characteristics

SURPASSING in performance and economy any similar product on the market, Vinylite window shades have been introduced by the Charles W. Breneman Co., Cincinnati, Ohio.

The new product, called Plastishade, retails at $1.59 to $1.79 for shades 36 in. wide by 6 ft. long, a dollar below the cost of the finest coated cloth shades. Under parallel tests for tear resistance, flame-retardant properties, flexibility, abrasion and crease resistance, fastness to light and washability, the Plastishade has proved superior to all competition.

The new shades are 0.006 in. thick and come in four colors: green, ivory, white, and tan. They are unaffected by moisture, mildew, or insects, will not tear or puncture in normal use, are resistant to fading, cracking, shrinking, and staining. They will not unravel and have no filling to break or fall out. They can be easily cleaned by wiping with soap and a damp cloth or sponge.

Temperature changes and full or partial exposure to sun or inclement weather do not affect the usefulness and life of the shades.

COURTESY BAKELITE CORP.

Window shades made of 0.006-in. thick vinyl are unaffected by moisture or mildew, are resistant to fading, cracking, and staining

No More Laundering

Headrest covers for railroad train seats cost less in vinyl than in cloth. They eliminate laundering, reduce inventory

LOW original cost, lower maintenance costs, and much less frequent replacement for headrest covers in railway cars have been obtained this year by the Baltimore and Ohio Railroad Co., Baltimore, Md. The company has replaced the old linen towel-type headrest covers in its passenger cars with covers made up of 0.008-in. clear vinyl. The Baltimore and Ohio emblem is imprinted on the covers.

Costing approximately 66% of the cost of a cloth headrest cover, the plastic protectors need only to be wiped clean with an antiseptic solution after each trip. The cloth covers had to be laundered at an approximate cost of 2¢ each per trip.

Investment economy was obtained as well, because with cloth covers it was necessary to have three sets to allow time for laundering; with the plastic headrests the company needs only one set per car, plus a few extras.

Finally, considerable time is saved at the terminal by not having to remove the soiled covers and put on new ones. It is reported that the vinyl covers have received much favorable comment from the traveling public using the B & O.

Headrest covers made of 0.008-in. clear vinyl have been adopted by B & O in place of cloth covers

COURTESY BALTIMORE AND OHIO RAILROAD CO.

Plastics and Glass Get Together

THE use of glass fabric with synthetic resins has been simplified by Waterway Projects, Inc., Los Angeles, Calif., with a new method of putting color on the glass filaments. The method is said to be similar to that used in coloring ceramic. Not only is the drape and hand of the woven material improved by the process, but the compatability of the material with vinyl and other resins is heightened. A complete range of permanent color is available—color that is light, fast and won't burn off, even in an open flame. In addition, metallic coatings may be applied by this process.

In the drapery and furniture-covering field, this development is declared to mean finished goods at a price approximately 20% lower than traditional levels.

One use of glass fabric colored by new process is in window curtains

PLASTICS BUILD BETTER PRODUCTS AND BETTER VALUES

PHOTOGRAPHY

Better Brownies at

Latest Hawkeye Brownie, left, has grey cellulose acetate butyrate operating parts and black phenolic body. Non-plastic model of 1920's at right

THE classic box Brownie, common denominator of all cameras, is now being manufactured of plastics in a number of different models. This change—from the first wooden, leather-covered box to precision-molded plastic—dates to July 1934, when the first all-plastic Baby Brownie camera was introduced. Since that date, the Eastman Kodak Co., which manufacturers all Brownie and Kodak cameras, has placed on the market many other all-plastic cameras of the simple fixed-focus type. It has also, from time to time, incorporated plastic parts in numerous other cameras. The latest, and by all odds one of the finest simple cameras ever produced, is the perky little Brownie Hawkeye—a smartly designed all-plastic camera which has tremendous eye appeal and excellent picture-taking qualities.

The greatest number of Brownies and simple, low-priced, fixed-focus cameras now manufactured by Kodak are made almost entirely of plastic. This change from wood and leather, or cardboard and artificial leather, to plastic has not, however, taken place overnight. It has been the result of an extensive series of developments, continued research, and concentrated effort to make the finest possible camera available to consumers at a low price without, at the same time, lowering quality or picture-taking ability in the process.

The Baby Brownie—the first practically all-plastic Brownie and the first example of the use of plastics in the Brownie line—was made of plastic, for example, primarily to offer the public a good camera at the low price of $1. At the time (in 1934) the cost of producing box Brownies, with wood or heavy cardboard cases covered with artificial leather, had already reached such heights that it was no longer possible for Kodak to manufacture, by conventional methods, a quality

Lower Cost

Eastman Kodak rates plastics high for solving production problems, is steadily pushing plastics usage to produce quality merchandise

camera selling for $1. The Baby Brownie, with three parts molded from Bakelite phenolic, was able to fill such a role.

Kodak's "vest-pocket" size Jiffy camera was next. This trim little picture taker was designed to provide a low-cost, compact outfit with great eye appeal. In achieving this goal the use of phenolic resins helped considerably since they particularly assisted in reducing the cost of the camera case—always an expensive item. The first of the famous Kodak Bantams, introduced in 1935, was another camera made with a plastic body. The next two cameras produced by Kodak and made almost entirely of plastic were the Bullet, introduced in 1936, and the Six-20 Bulls Eye, marketed for the first time in 1938. They were also molded of phenolic.

Before the War

Two other nearly all-plastic cameras were produced by Kodak before the war. One of these was the Baby Brownie Special which was introduced in 1939 to increase the usefulness and eye appeal of the original design. Another was the Brownie Reflex—one of the first inexpensive cameras of the popular twin-lens reflex type.

Plastic parts were used, in addition, in a number of cameras where plastics could meet the requirements for dimensional stability, impact strength, and resistance to cold flow. This use of plastics continued during the war years, when cameras such as the Kodak 35 with range finder were being used extensively by the Armed Forces. The case of that sturdy and highly satisfactory little camera was also made of high-impact phenolic.

Plastics Use to Expand

Since 1945, Kodak has introduced two cameras which make extensive use of plastic. It has also incorporated plastic parts in a number of others with considerable success. The company is now convinced that plastics, properly used, represent a definite solution to some of the problems it faces in producing fine cameras at low cost. It also expects that the use of plastics will grow in the industry as a whole.

The two post-war Kodaks which use plastics extensively are the Kodak Duaflex, manufactured in two models with different type lenses, and the Brownie Hawkeye. Only the side panels and a few incidental parts of the Duaflex are made of plastic, but the way in which the panels are made is new in the field. The Brownie Hawkeye has an all-plastic body, front, and roll holder, and is a camera which has proved to be a best seller.

In designing the Duaflex, it was originally intended to produce the camera with aluminum side panels and front and back plates. As proposed, the aluminum side panels would have been painted black. However, cost estimates and other considerations forced the discard of the plan. As a result, high impact, high flow-point polystyrene—injection molded in a multiple cavity die

Of all modern mass-producing industries, of all present-day sciences and arts, none has been so basically dependent on plastics for its development as photography.

The medium of photographic expression—the film—is cellulose nitrate or cellulose acetate; plastics took over long ago from glass. The housings for many modern cameras are plastic, too, replacing metal, cardboard, and leather. Acrylic view-finder lenses are now produced in quantity, a low-cost and effective replacement for glass. The vinyls appear in bellows, gaskets, and trimming. And now formed copolymers are being used to make carrying cases.

Here is the story of plastics in photography.

Three molded phenolic parts in original Baby Brownie, top, kept down costs. Eye-appeal of contrasting knobs highlighted Baby Brownie Special, center. Current Brownie Hawkeye has butyrate and phenolic parts

High-impact polystyrene side panels of Kodak Duaflex are injection molded in a multiple-cavity die — permit rapid, accurate assembly

Panel of Kodak Duaflex at left has molded-in notches into which camera parts are positioned. Molded panels, which duplicate leather grain, do not require finishing, milling, or drilling. Parts fit into grooves of second panel, right. Unit can be assembled in 2 minutes

—was selected for the sides. There are eight cavities in both the left and right panel molds.

Design Speeds Assembly

Molding the side panels of the Duaflex in that manner achieves several desirable results. One is that the panel, as it comes from the mold, has an over-all finish which closely duplicates the grain of leather and thus requires no finishing operations. Second, the mold is so designed that no milling and drilling are required to complete it. Finally, it is laid out so that a number of the guides and notches required to hold other portions of the camera in position are molded-in. These guides and notches could not be incorporated in a metal part as easily or inexpensively. The net result is that, because of its molded side panels, the Duaflex can be almost completely assembled by one operator in two minutes or less.

The Brownie Hawkeye is practically all-plastic. It is also the logical outcome of this trend toward plastics in camera design, and the continued popularity of the box camera. It is, furthermore, a tremendously popular sales builder. In designing the camera, grey cellulose acetate butyrate operating parts were contrasted with a black phenolic body to achieve maximum eye appeal and pleasing design.

The Brownie Hawkeye is a perfect example of the manner in which plastics enable Kodak engineers and stylists to work together in the most advantageous manner. Stylists enter into the procedure because, to help attain the best possible reception for its products, Kodak maintains not only a Market Research Div. to sample public taste and desires, but also a Styling Div. to take products in hand and make sure they will appeal to the eye as well as the needs of the customer.

However, what Market Research, Sales, and Styling request, and what Engineering and Production can deliver, for the price, are often two different things. And that's where plastics come in. Their low cost—as in the case of the Brownie Hawkeye—and their finish as they come from the mold, make possible a number of cameras which could not otherwise be produced for the same figure.

Company Praises Plastics

Here is how Kodak feels about plastics in general:

Plastics lend themselves particularly well to the production of camera cases. This is because the camera case is one of the most expensive parts of the camera, and because so many finishing operations are required in relation to it. Plastic, in this instance, provides a fine exterior finish—as it comes from the mold—at no extra cost. Features can also be molded into the camera case that would otherwise require milling or drilling.

As an example of the savings which are possible, a molded case and a die-casting may be roughly equal in cost. The molding is finished, however, as it comes from the mold; the die-casting, on the other hand, requires further finishing operations. Thus, a 45-cent die casting may well end up costing much more because of the finishing operations eventually required.

Another advantage of plastics lies in the fact that trouble percentages are way down in good plastic molding jobs. This stems, in part, from the fact that parts can be molded-in which would otherwise have to be added. This reduces the number of tolerances which must be kept and thus reduces production headaches.

Long-Lived Dies

Dies also stand up longer in molding plastics than they do in other types of camera fabrication. This is particularly true of molding dies when contrasted with those used on punch presses or in die-casting. Because of this longer die life, one set of dies usually lasts for the life of a camera.

In addition, the versatility of plastics lends itself well to such things as parts elimination. The Target Brownie, for example, is a standard cardboard and artificial leather box camera—one of the type that has been used by picture takers everywhere for years. It contains 74 parts. On the other hand, the latest and snappiest of all box cameras—the all-plastic Brownie Hawkeye—which has many times the eye and sales appeal of the Target Brownie, and which is also proving from a picture-taking standpoint to be one of the finest fixed-focus cameras ever produced, has only 61 parts.

In making every one of these parts, the photographic industry requires, in most cases, a rather high order of precision in the parts involved. Plastics have, in general, always been able to meet this requirement, but early plastics did not do so well on other counts. During recent years, however, there has been a considerable improvement in the impact strength and dimensional stability of plastics. As a result, plastics as a whole are now better fitted to camera production.

By utilizing advanced methods of plastic fabrication and by combining photographic, optical, and plastics know-how and quality control, the Eastman Kodak Co. is steadily pushing forward in the field of plastics. It is also achieving its objective by producing low-cost, high-quality merchandise for the general picture taker.

The Pixie Camera—Engineered for Plastics

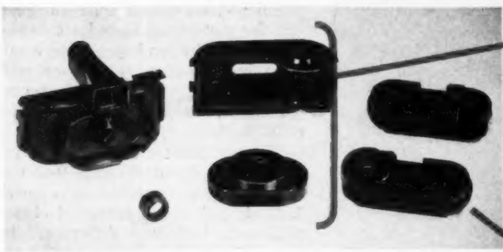
First magazine-loading miniature camera made in U. S. sells for under $5

THE post-war influx of foreign made miniature cameras started a vogue for tiny cameras, a vogue which took hold despite the high price of most of the sub-miniature cameras. It took an American manufacturer to produce a high-grade 16 mm. magazine-loading camera which retails for under five dollars. This low price was made possible by the use of molded polystyrene for almost all the structural parts of the camera and its accessories.

The new camera, called the Pixie, is manufactured by Wm. R. Whit-

Molded polystyrene construction of almost all structural parts helped Pixie become first American-made magazine camera selling under $5

Polystyrene display package, left of photo at right, for camera has ivory-colored base and transparent top. Viewer, right, of same material, has lens produced from 10-cavity mold



Main parts of Pixie are body and back, upper left and center; lens bezel and front, lower left and center. Two-part magazine is at right

Shipping containers for Pixie magazine, at left and right, are molded of black polystyrene

taker Co., Ltd., Los Angeles, Calif. It is small enough to be worn on the wrist (2⅛ by 1½ by 1⅜ in.), and takes pictures with a negative size of ⅜ by ½ inch. It is said to be the first magazine-loading miniature camera ever produced in this country. It has a fixed-focus lens and a shutter speed of 1/50 sec. The lens opening can be set at "Color," "Dull," or "Bright" (f/6.3, 8, and 16, respectively).

Each magazine holds 14 frames of black-and-white or color film, and retails for $1.29. The magazine comes in a polystyrene container which can be used to mail the exposed film to the Whittaker company for processing at no additional charge.

The Pixie camera consists mainly of four pieces of black Lustrex heat-resistant polystyrene. The main body, the back, a front plate which

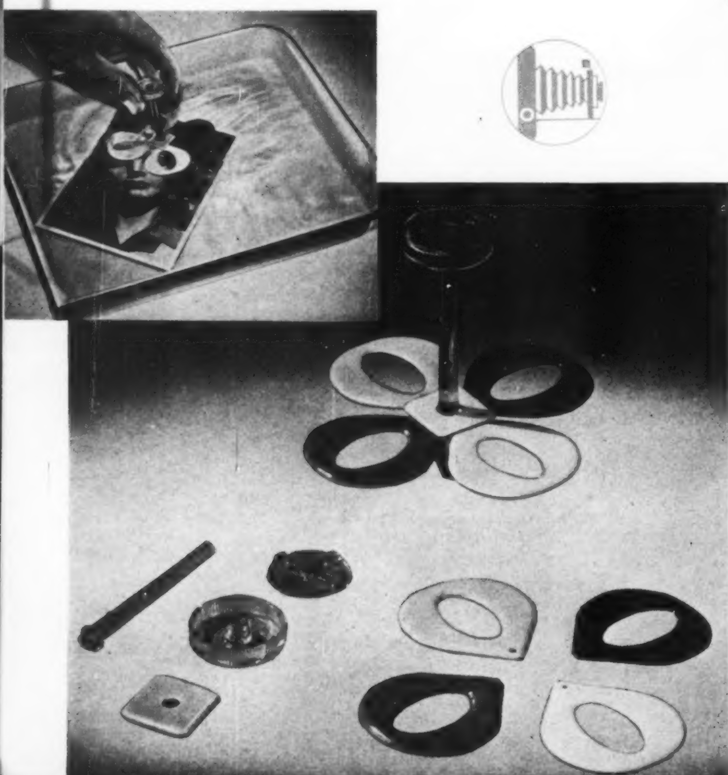
(*Continued on page 258*)

How to Produce a Camera Speedily and Economically
(The Way Plastics Are Used in the Pixie and Its Accessories)

	Plastic parts	*Material*	*Molds*	*Parts per hr.*
Camera	main body back front plate lens bezel	black polystyrene	4-cavity	460
Display package	base	ivory polystyrene	8-cavity	720
	top	transparent "	8-cavity	720
Magazine	two halves	black polystyrene	4-cavity	520
Magazine container	top bottom	black polystyrene	24-cavity	1600
Viewer	two halves of body	mottled polystyrene	6-cavity	600
	lens	transparent "	10-cavity	1000
	diffusion sheet	0.010-in. cellulose acetate sheet	......	......

Plastics Matched to Print Tones

Darkroom aid takes advantage of exact color control possibilities of polystyrene



IS there a product which can exist only if it can be made in a color tone which matches something else exactly? Then that product can be made economically of plastics. This is proved by the Agi-Tone Comparator made by Arpin Products, Inc., Orange, N. J.

Five different color tones had to be matched exactly in order to produce the comparator. This might possibly have been done in glass, but the cost would have been excessive, and the end product would have been fragile. It is done with specially compounded polystyrene —and the finished product retails for only $1.50.

The comparator is made for use in photographic darkrooms to determine the proper tones of a print. It is shaped like a four-leaf clover, and each leaf is a different color tone. The lightest leaf matches the

Holes in comparator leaves, upper inset, help match print to color standard. Polystyrene parts, bottom, include stem, handle and holding pieces, and four color leaves

flesh tone usually desired for portrait prints. The next leaf is the proper color for a normal sky. The third can be used to match clothing, walls, or other mid-key values in a print. The darkest leaf is for the dark sky in a filter shot, or for shadows.

Each color standard has a large hole which is placed over the portion of the print in question. The photographer then watches the tone of the print deepen until it just matches the standard, at which time development is stopped. Inasmuch as adjacent colors can be matched easily, the Agi-Tone enables amateurs to select the proper print value or to match duplicate prints exactly.

The four leaves are molded of polystyrene which is compounded to rigid color specifications by Gering Products, Inc., Kenilworth, N. J. The four pieces are held together between two flat pieces of polystyrene. Molded-in pins on one piece and mating holes on the other position the four leaves.

The stem of the Agi-Tone is also molded of polystyrene specially compounded by Gering. The color, in this case, is a special shade of amber. When the developer in the tray gets as dark as the stem, the photographer knows that it is time to dump the tray and start using fresh developer. As its name indicates, the Agi-Tone can also be used as a developer agitator.

Revere's Case in Point

A PRODUCT as carefully engineered and manufactured as a motion picture projector and a product that creates in the buyer such pride of ownership deserves the best in a carrying case. Styling, durability, and ease of cleaning are important factors.

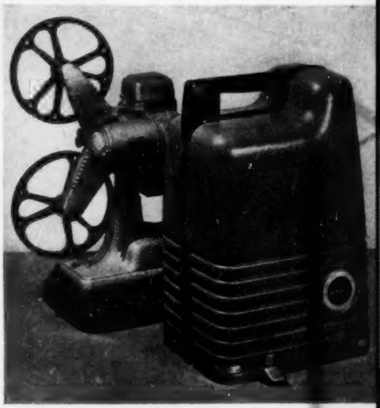
Recently Revere Camera Co. introduced a new line of camera equipment that included two sizes of film projectors. Disregarding all housing precedent in the field, Revere turned to well-styled carrying cases fabricated from copolymer sheet.

The resulting housings set a new high standard for such units and open up many possibilities for similar types of design and fabrication of this new plastic material.

Working with Revere, Furnel Inc., Chicago, Ill., and Regal Plastic Co., Kansas City, Mo., spent 18 mo. in development work and produced two cases, one for an 8-mm. model and one for a 16-mm. model, which are made up of molded Bakelite, formed Royalite, extruded Tenite II, plus metal hardware and a metal reinforcing frame.

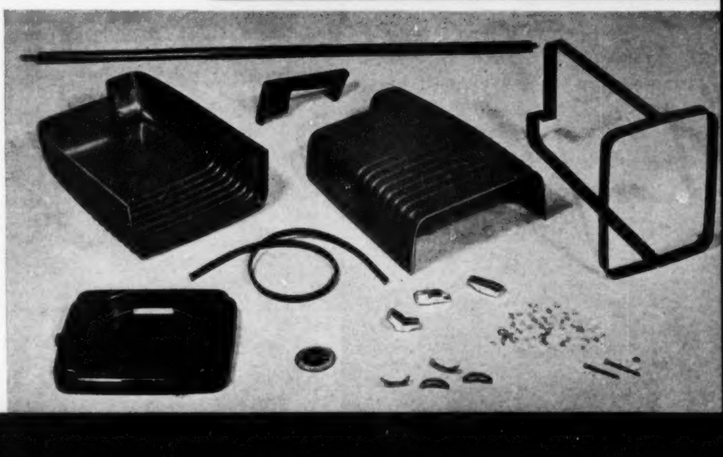
Because of the materials used, the new case is intrinsically more expensive than the former box. The use of formed copolymer sheet stock and comparatively inexpensive and simple tooling, however, made the deal competitive. The streamlined beauty of the new unit rules out confusion with other merchandise. The new case is light in weight, extremely attractive in appearance, and will outlast even leather cases. It will not stain, spot, or streak even in salt water. Oil, grease, and even lipstick can be easily removed, leaving no marks. Insects, which could attack the felt lining of the former case, shun the new one. Impact strength and resistance to abrasion and fracture are outstanding.

The case is manufactured by Regal; handle and base are compression molded by Plastic Molders, Inc., Chicago, Ill.; the extruded "H" section is made by K-S-H Plastics, Inc., St. Louis, Mo.



Upper right: Carrying case of copolymer sheet material for projector

Right: Streamlined case, at right, for Revere camera is spot-proof



Below: Main parts for projector case include two sides and handle, upper left and center; frame, upper right; and molded base, lower left

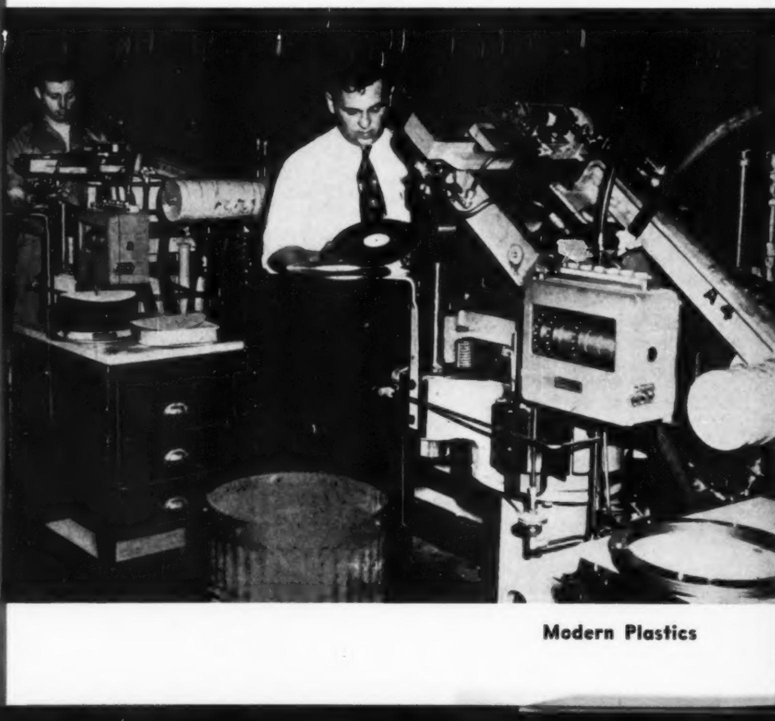
PLASTICS BUILD BETTER PRODUCTS AND BETTER VALUES

PHONOGRAPH RECORDS

Synthetics Supplant

Extruded plastic compound for records is scored into preforms as it moves along conveyor. Preforms are separated and stacked prior to delivery to press

Rectangular device in foreground of record press is automatic controller for press and heating and cooling mechanisms. Overall cycle is about 25 seconds



Shellac

First used as a war-time replacement in phonograph records, plastic resins have proved so superior to shellac that they have taken over almost the entire market

TEN years ago almost all phonograph records were made of shellac plus filler. This caused no pleasure in record molding or stamping plants, even when shellac was low in price, because uniform material was seldom obtainable. Shellac, which makes up into breakable records, comes from India. In 1940 supplies were cut off and prices soared. Enter plastics! By 1945 there were under test for record manufacture several resins, resin extenders, and new fillers.

Record production in 1947 was 325 million; for 1948, 200 million; for 1949, 250 million. There are three main types of records and, according to Neil F. Harrison, Editor and Publisher, **Record Retailing Magazine, Listen,** and **The Record Year Book,** the 1949 breakdown of these three types was about as follows:

Unbreakable or all-vinyl records 15%, break-resistant records 25%, "shellac-type" records 60%.

The third category retains the name "shellac-type" for identification only; today out of the 118 million lb. of resins, fillers, and extenders used in producing 250 million records, only about one million lb. is true shellac.

On the basis of weight, here is what the three types of records used in materials: unbreakable records used 10 million lb. of vinyl, practically all Vinylite; Break-resistant records used two million lb. of vinyl resins, four million lb. of extenders, and 14 million lb. of fillers; The "shellac-type" used the aforementioned one million lb. of shellac, four million lb. of ethyl cellulose and Formvar resins, eight million lb. of extenders, and 75 million lb. of fillers.

Record Compounds

Formulas for record-making compounds are numbered in the hundreds. The "shellac-type" record makes use of a very small amount of resin binder — approximately 5 percent. The break-resistant type requires approximately twice as much resin binder, the additional quantity of binder being the sole reason for the increased impact resistance of this type. In the case of both kinds of records, the binder resin is extended about 200 percent.

Ethyl cellulose made by Hercules Powder Co., Wilmington, Del., and Dow Chemical Co., Midland, Mich., shares the resin market in the "shellac-type" records with Formvar, a polyvinyl formal resin made by Shawinigan Products Corp., New York, N. Y. There are two chief resin extenders in records: Vinsol, a Hercules resin obtained from pine wood, compatible with many other resins and solids; and Valite, a resin extracted from sugar cane bagasse by Valite Corp., New Orleans, La. Some cuomarone indene is also used as an extender.

As to fillers, the chief ones noted are calcium carbonate, slate flour, clay flour, powdered bagasse fiber, and walnut shell flour.

A good example of a modern formulation for break-resistant records is that used in the "Metrolite" records (non-breakable under normal use) recently introduced by Metro-Goldwyn-Mayer Record Co., Bloomfield N. J. The record contains 10% Vinylite, 20% Valite, and a 70% combination of calcium carbonate, slate flour, and carbon black. Arnold L. Pipper of M-G-M Record Co., states that the plastic resins are so superior to shellac that shellac would probably never replace them even if its price dropped drastically.

How Records Are Made

The production setup at the Bloomfield plant of M-G-M is probably about the best in the industry. Components of each batch are weighed out into a large open container set on wheels. This container is then wheeled across the room and dumped into the hopper of a conveyor system. Thence it is carried to the second floor and deposited into a ribbon blender. After the

(Continued on page 257)

Below: Unbreakable, 6-in. polystyrene records for children are injection molded on single-cavity press. At right: 6-in. disks are turned out in two-cavity mold. In both cases, records are center-gated. Flash removal is not required

PLASTICS BUILD BETTER PRODUCTS AND BETTER VALUES

HOUSEWARES AND HARDWARE

Brookpark pattern of Arrowhead EverWare line of melamine tableware is molded in four harmonizing colors that blend in with the decor of a modern home. The tableware is molded square, thus utilizing table space to greater advantage

The Melamine

THE entry of melamine into the tableware market—a field where low initial cost, continual replacement, and traditional design and handling habits had long held sway—was a big step for compression molders. But the proposition had the advantage of good market research, design study, extensive promoting, and much field testing by the Plastics Div. of American Cyanamid Co.—plus the fact that the material and the products themselves were superior to anything previously conceived for the purpose.

In 1948, sales of melamine resins for molding tableware increased 350% over the previous year. In 1949, sales jumped 50% over 1948. The number of molders specializing in heavy-duty tableware molded of Melmac material has also increased: 1946, two molders; 1948, 11 molders; today, 14 molders.

Key factor responsible for this increase in the use of melamine resins is the American Cyanamid Co., whose tireless and brilliant merchandising efforts in the behalf of melamine tableware are now bearing fruit. Of all alpha-filled melamine produced by American Cyanamid, 80% goes into the production of Melmac Heavy-Duty tableware.

Stymies Overcome

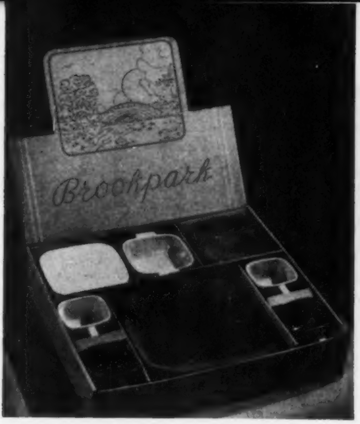
The success of melamine tableware has been achieved in the face of a number of stymies. The biggest problem was to overcome the attitude of the buyer. Plastic dishes on the market, previous to the appearance of the melamine dishes, were objected to on the grounds of appearance. Then, too, the public had a preconception that plastic tableware would not stand up under normal usage. But in test after test, melamine tableware has proved itself in every respect. Seven important favorable factors are outstanding:

1) Melamine tableware is considerably less fragile than chinaware or earthenware. In fact, in one stool and counter restaurant, one set of melamine plates has been in service for over two years. The operator of this restaurant estimates that he would have used four complete sets of earthenware over this same period. In one state institution, the superintendent estimates that the breakage of melamine tableware over a 30-day period was no more than that of a normal one day breakage in earthenware. The fact that the Armed Services uses melamine tableware further substantiates the ruggedness and durability of this material.

2) Melamine tableware is less noisy in the kitchen and in service. In hospitals, schools, and crowded cafeterias, this factor is of major importance.

3) Melamine tableware is one-third as heavy as standard earthenware service. At the same time, it can have the feel of substantial and high-grade dinnerware.

4) Since melamine tableware parts are molded in identical dies,



Brookpark 20-piece set is attractively packaged in carton which also serves as dealer display box

Says J. M. Fisher, buyer of housewares at Montgomery Ward, Chicago, Ill.; "The growth of plastics in housewares has been one of great progress in the past four or five years, and is becoming a large and profitable part of our business. We feel that the position of plastics in the household has enormous potentialities and that if the present pace is kept up in the development of new lines of plastics, it will soon be one of the largest parts of our business."

From garment bags to measuring spoons, from tableware to flower pots, every plastic resin finds some useful appilcation in housewares. Polystyrene is, of course, the largest volume resin in this field; it is estimated that at least 50 million lb. of this resin went into housewares in 1949.

In the related hardware field, the record is less spectacular but nevertheless quite distinct and full of solid promise. A good general hardware store maintains an inventory list of about 60,000 items; today fully 10,000 of those items are at least partly plastic. Ten years ago the only plastics shown in hardware stores were in the electrical department.

Tableware Story

In three years, a new material has overcome centuries of tradition in the commercial tableware field. With quality proved, the future of melamine resins in tableware is unlimited

COURTESY AMERICAN CYANAMID CO.

Bus boys carry larger loads of dishes made of light weight melamine

they stack uniformly, conserving space in kitchen and restaurants.

5) Melamine tableware has good insulating properties and helps to keep food hot or cold.

6) Melamine tableware is available in brilliant colors or soft pastel hues that will not wear off.

7) Melamine tableware is odorless and non-toxic.

Economically Sound

Dramatic proof of the economics of melamine tableware appeared in the December issue of the *Journal of the American Hospital Association* as a report of a recent speech by Franklin D. Carr, administrator, Waukesha Memorial Hospital, Waukesha, Wis. Entitled "Plastic Tableware—A Report on Actual Use and Future Possibilities," Mr. Carr's speech, as shown by the following quotes proved the case for melamine tableware:

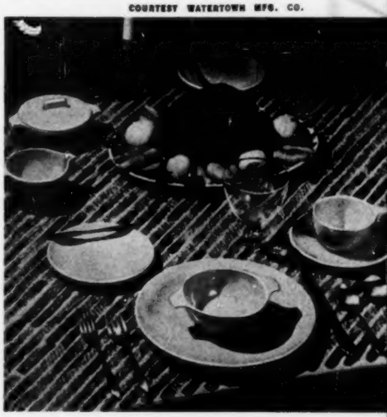
"Plastic tableware, of the new, heavy-duty type developed during the war, is now being successfully used in about 25% of our hospitals . . . The successful use of plastic tableware by hospitals, as well as by other institutions and commercial restaurants, has created much interest on the part of hospitals now using ceramic tableware exclusively . . . It is readily apparent that the most important single advantage of plastic tableware is lower breakage.

"The Permenente Hospital, Oakland, Calif., a hospital of 1000 beds, which has been using melamine tableware for all purposes the past year, reports that replacement costs of plastics during the first year were 6.6% as compared with 21.9% for chinaware during the previous year. The saving in this instance was 70 per cent.

"In my own hospital (Waukesha Memorial Hospital, Waukesha, Wis.)," continued Mr. Carr, "we replaced one of the least expensive grades of china with the most expensive brand of plastic for all patient service. After one year of use we found that breakage (mostly cups) amounted to 8.1% of the pieces or 8.5% of the dollar value of our original investment in plasticware. The replacement cost amounted to only 12.9% of our pre-

Smart, modern styling of melamine Lifetime Ware is gaining attention

COURTESY WATERTOWN MFG. CO.



vious annual replacement cost on chinaware.

"The Orange Memorial Hospital, Orange, N. J.," reported Mr. Carr, "states that it has been using plastic tableware in the nurses' dining room for the past four months, with an average replacement cost of $5.48 per month. This compares with an average monthly cost of $129.30 for chinaware. In other words, the saving to date on this short term usage has been 95%."

Hospitals are not the only commercial markets to find melamine tableware generally acceptable. Restaurants—53% of the commer-

(Continued on page 252)

It All Hangs on the Handle

Household brushes gain consumer appeal when provided with colorful, long-lasting polystyrene handles

HANDLES for household brushes, which for years were made almost solely of wood, today are using plastic to the extent that wood has all but faded from the picture.

Although the cost of a plastic handle is approximately 50% greater than that of a wooden handle, most brush manufacturers feel that the change is justified since plastics provide smarter styles, exciting colors, and lasting finishes.

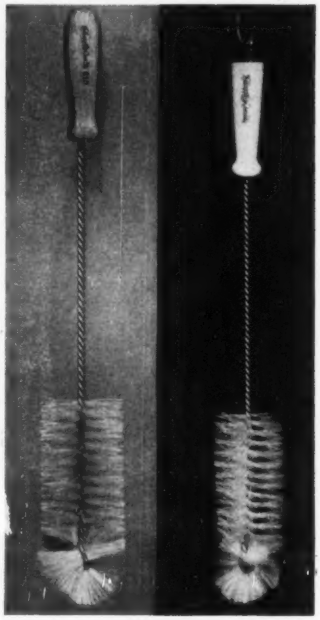
Good Consumer Response

One manufacturer who has made the change and who has found that its plastic-handled brushes have met with hearty consumer approval is the Kellogg Brush Mfg. Co., Westfield, Mass. Kellogg's new handles are injection molded of heat-resistant ivory Lustrex polystyrene with red trim.

The company has found that the plastic handle has eliminated the common trouble of the handle coming loose from the brush. Now, the brush wires are welded right into the polystyrene handle, thus removing any chance of the brush working loose.

Yet another advantage that Kellogg found in the plastic handles was that it could mold-in eyelets as a convenient and inexpensive means of hanging the brushes. The wooden handles used screw hooks.

Although sales figures are not yet available on the new line, the company reports an increase directly traceable to the superior qualities of the polystyrene handles.



BEFORE AFTER

Although their cost is 50% greater than wood, the polystyrene handles provide smarter styles and finishes

COURTESY KELLOGG BRUSH MFG. CO.

Copolymer Takes Weather in Its Stride

Rain gage molded in two parts is more leak-proof than former metal-glass unit, withstands freezing weather. Molded-in calibrations are absolutely uniform. Shipping weight is low

THE town of Albert Lea, Minn., is becoming nationally known as the home of Jobs, Inc., an organization of local businessmen started early in 1946 to expand job opportunities for returning veterans. Through its promotion of local talent and facilities, the organization has increased employment in the town about 40%.

One of the projects of Jobs, Inc. is the Tru-Chek rain gage, designed to be used by small radio stations, citrus growers, farmers, sportsmen, and even city and suburban gardeners who are interested in the amount of rainfall. Heretofore, rainfall information was available only through the nearest weather bureau.

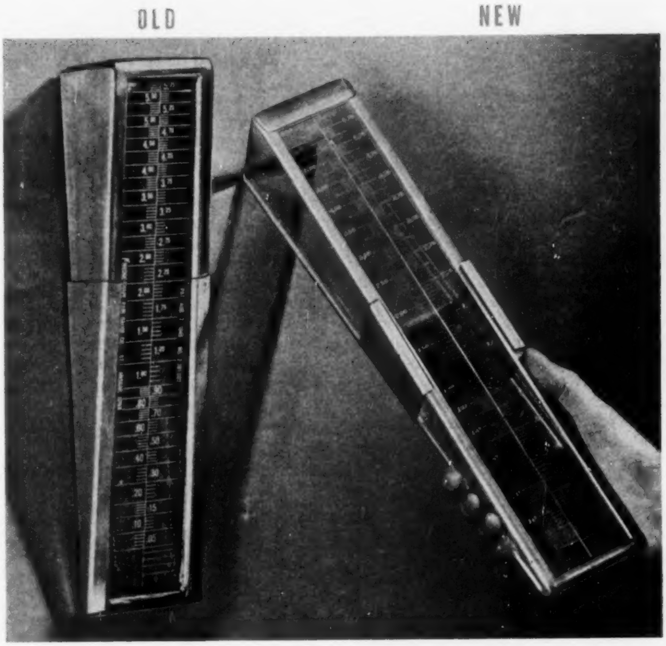
The original gage was made of an aluminum casting combined with a glass panel upon which the calibrations were printed. The new

gage is all plastic, molded by Minnesota Plastics Corp., St. Paul, Minn., from Plexene M material.

The main reason for the changeover to the copolymer was the difficulty of making a permanent bond between glass and aluminum; resultant leakage made the instrument inaccurate. In the plastic unit the two molded parts are welded permanently with a solvent to prevent leakage of collected rainwater.

Breakage too, was a factor, both in shipping and in use in the field, because in freezing weather, glass panels frequently broke. Another point in favor of the plastic was that the calibration engraved in the mold provides absolutely uniform gages.

The new product has shown excellent resistance to weather, has proved up under severe impact, and has a shipping weight about one-third that of the original.



About 1/3 the weight of the old alumium-glass gage, the new styrene copolymer rain gage is weather resistant, can withstand severe impact

Better Clothespins Sell Better

Polystyrene clothespins sell by the millions because of durability, attractive colors, and other advantages over wood

Plastic clothespins are neatly merchandised in window and re-use boxes

EVEN that commonplace, yet vitally important household item—the clothespin—which, for generations has been made of wood, one of the cheapest of materials, has turned to plastics.

Wooden clothespins, which now have to fight for their lives in the market, have many obvious disadvantages: They break easily; they get waterlogged; they are often rough and snag fine fabrics; they become dirty easily; and they cannot be properly cleaned.

Plastics, on the other hand, offer many outstanding advantages. They possess a wide range of attractive colors, are smooth and will not snag clothes, can be easily cleaned, and are more durable than wood.

(Continued on next page)

One of the largest manufacturers of plastic clothespins today is Mastro Plastics Corp., New York, N. Y. At the present time, Mastro is producing 250,000 polystyrene pins per day and reports indicate that production can be stepped up to the million mark, if necessary.

Housewives Help in Design

Mastro manufactures two types of clothespins—the regular tension type and a clip type that has a boxed-in steel spring. In designing these clothespins, Mastro met the specific needs of the housewife. Countless women were called upon to find out exactly what they wanted in the way of a new plastic clothespin. The new Mastro pin has been awarded the Good Housekeeping Seal of Approval.

Although the plastic pins, which are made in eight assorted colors, sell for a third more than do wooden pins, they are economical in the long run due to their durability, cleanliness, and smooth finish. The tension type retails for 1¢ per pin; the clip type for 2½¢ per pin.

In addition to molding superior clothespins, the firm has done an unusual job of merchandising. Backed up by a national advertising campaign, Mastro put into effect one of the neatest packaging programs yet to be seen in this field. Using cellophane window boxes, counter cards, and clear polystyrene containers, Mastro has sold hundreds of millions of its pins through large retail organizations. The polystyrene packages, which are backed up by attractive point-of-sale material, have proved themselves saleswise due to their re-use value as refrigerator dishes.

Color and Design Help Sell

Wooden clothespins are traditionally sold in bulk from a hardware store bin or tied to drab cards in cluttered attempts at pseudo display. Today, plastic clothespins are a colorful impulse item in supermarkets. The variety chain counts them as basic goods. Department stores feature them in several departments. And the hardware stores put them, not in bins like the wooden pins, but up front!

Which all goes to prove that it is not sufficient for a plastic product, particularly if higher priced than the previous product, to be superior in use; it must be sold better too.

Plastic Flowerpot Sales Soar

Five customers of a flowerpot molder bought 1,256,560 units in 11 months. Total sales were 3,602,140 pots

Clay pots are dressed up in expensive tinfoil to attract customers. Colorful plastic pots are self-decorative, need no wrapping

FROM January to November of last year, the five leading floricultural customers of Rogers Plastic Corp., West Warren, Mass., purchased an aggregate of 1,256,560 polystyrene flower pots. The rest of Rogers' jardinier customers bought another 2,345,580 pots, bringing the sales total for 11 mos. to 3,602,140 flower pots.

This is an unusual sales record for any one plastic manufacturer to achieve in a market that for years has been using only clay pots.

Price obviously was not the reason; clay pots are approximately 50% less expensive than plastic pots. But florists and growers report that the overall expenses saved by the use of plastic pots more than compensates for their higher costs.

Freight Costs Reduced

The polystyrene jardiniers are, of course, not so fragile as their clay counterparts and their percentage of breakage is low. The light weight of the plastic pots permits a substantial savings in shipping costs. Having color, the plastic pots do not need any special wrappings to improve their shelf appearance. Today, most florists are required to use costly

tinfoil to decorate their clay pots.

Growers, too, report savings through use of the plastic flower pots. Their greatest savings is in the labor required to water the plants. The polystyrene pots retain 20% more moisture than clay pots.

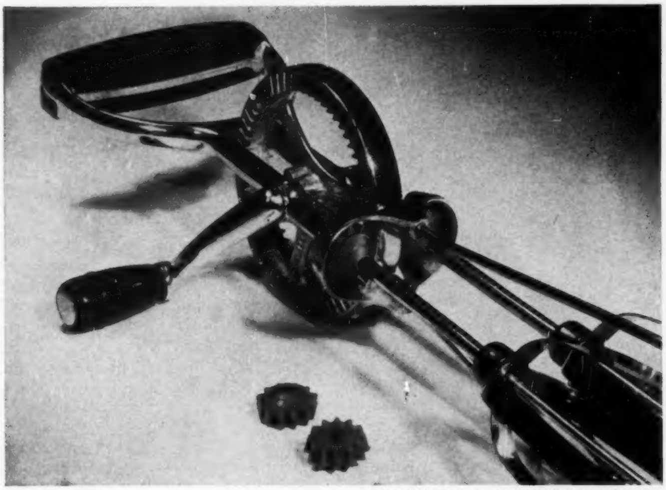
Linus H. Jones, assistant research professor of Botany, Massachusetts State College, has the following to say regarding the Rogers polystyrene pots: "Bright sunlight in the greenhouse has not affected the color of the pot. . . Soil acids have not made any impression on the surface gloss inside the pot. . . White roots were growing against the inside wall of the pot, which would not have been the case if the plant were absorbing a chemical that was known to be toxic to protoplasm."

Alex Laurie, professor of floriculture, Ohio State University says: "Much less evaporation of water. . . Plants in plastic pots will grow better than in clay."

It is reported that many of the large floricultural syndicates are now demanding that their growers supply plants in plastic pots.

Longer Life for Beater Gears

Test runs show 10 times the wear life for nylon egg beater gears compared to die-cast zinc



COURTESY E. I. DU PONT DE NEMOURS & CO., INC.

Injection molded nylon gear for egg beater replaced die-cast gear; tests proved nylon's longevity

TO DETERMINE the effectiveness of nylon gears for an egg beater as compared with gears made of a die-cast zinc base, Ekco Products Co., Chicago, Ill., ran a comparative gear wear test using standard egg beaters mounted over vessels containing viscous motor oil.

Under this test the nylon gears lasted 10 times longer than the zinc gears.

This test, which proved the longevity of nylon, prompted Ekco to replace the zinc gears in their "Best" egg beater with gears made of nylon. The nylon gears, which are injection molded by Ekco, are no more expensive than the original zinc base die-cast pinions.

10,000% Increase in 11 Years

Aiming at mass markets for household articles, one proprietary molder now produces 86 different items

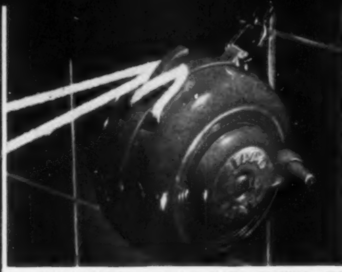
SIGNIFICANT proof of the fact that plastics are reaching mass markets not only in competition with, but ahead of other materials is evidenced in the amazing record of Columbus Plastic Products, Inc., Columbus, Ohio. In 1938, Columbus was consuming molding powder at the rate of 200 lb. per day. Today, Columbus is molding thermoplastics at the rate of 20,000 lb. every 24 hrs.—a 10,000% increase in 11 years!

It took 11 hard years of market study, designing, mold making, manufacturing, improvements, merchandising, and then starting the cycle all over again before Columbus could realize the business it now enjoys. In many important circles in the plastics industry, Columbus Plastic Products is considered to be the world's largest molder of polystyrene. Although it regularly molds all thermoplastic materials, approximately 90% of its current production is in polystyrene.

The company was primarily established to do custom injection molding and the usual required finishing jobs. Its first custom jobs included hacksaw handles, pistol grips, towel bar brackets, and soap dishes. Late in 1938, it placed on the market its first proprietary item—an indoor clothesline reel encased in a cellulose acetate housing.

From that modest beginning, the Columbus houseware line, which is known as Lustro-Ware, has grown to include 86 different items, practically all of which are in the housewares field. The majority of the Lustro-Ware line consists of bathroom

Only half of Columbus Plastic Products' 86 proprietary items are pictured above. About 90% of the company's current production is in polystyrene



PHOTOS COURTESY COLUMBUS PLASTIC PRODUCTS, INC.

Latest version of clothesline reel, company's first proprietary item

and kitchen equipment. Columbus now has three lines of bathroom fixtures: a medium-priced line of surface attached fixtures, a low-priced line of surface attached fixtures, and a line of built-in recessed fixtures. Each line consists of a soap dish, toothbrush and tumbler holder, paper holder, robe hook, and four different lengths of towel bars with brackets.

The bulk of the company's proprietary plastic business, however, is made up of sales of the many miscellaneous-use Lustro-Ware items such as silverware trays, spice cabinets, cake cover sets, canisters, bread baskets, napkin holders, serving trays, tumblers, coasters, clothesline reels, knife racks, refrigerator dishes, and egg trays.

Prices Becoming Competitive

Practically all of the above items have their counterparts in non-plastic materials. The bathroom fixtures compete with china, porcelain, and metal fittings—the refrigerator dishes have taken much of the market away from glass dishes—silverware or cutlery trays have so many advantages over plain or flocked wooden trays that some wooden tray manufacturers have been shoved right out of the market—plastic canisters hold numerous advantages over their metal counterparts in that they are non-rusting and easy to clean. It is expected that if prices are kept at reasonable levels, the plastic canisters will make large inroads into the metal market.

In the early years, Columbus, like all other molders, was plagued by the relatively high prices of molding powders and the fact that sometimes the materials did not possess the physical characteristics required for specific jobs. In addition to these general problems, there was the difficulty of obtaining designers experienced in molding plastic parts.

Attention to Design

Even in its earliest proprietary operations, the company paid special attention to the selection of proper materials and designs which would permit the plastic to function well under normal usage. Continued vigilance here has proved profitable.

A final problem, and a very serious

(Continued on page 254)

Vinyl Hose Can Take It

Lighter weight than rubber, crack-proofness, and resistance to rotting are some of the features of plastic garden hose

THE METEORIC rise of extruded vinyl garden hose has been one of the most significant plastic developments in the whole diversified hardware field. In direct competition with the conventional rubber hose, the plastic hose has fared exceptionally well mainly because it gives the user the advantage of being lighter in weight, crack-proof, non-rotting, and longer wearing.

In 1948, it was estimated that about 12% of the garden hose market had been taken over by vinyl. In 1949, the most conservative estimates place the figure at over 20% and quite possibly over 30 percent. This rise in the market for vinyl has been accomplished by better extrusion, better compounding of materials, better design of hose and fitting, better testing and application of guarantee, and better selling.

Prominent among the dozen or so companies currently extruding vinyl garden hose is the Sandee Mfg. Co., Chicago, Ill. Sandee's interest in vinyl garden hose dates back as far as the early 1940's when some samples of extruded tubing were submitted to the Armour Research Foundation for determination of burst resistance.

Market Study Made

In 1945, Sandee started rolling on its vinyl hose program. Before doing any actual work, a thorough study of the business, the volume, price structure, and distribution methods was made.

Although extensive tests were conducted, the 1946 production turned out to be a disappointment. Besides putting the hose on the market too late in the year to do large volume business (garden hose must be made in the fall and winter for distribution throughout the spring and early summer), the company had failed to investigate the effects of elevated temperature with water pressure turned on. It turned out that when this particular hose was left lying in the sun, the vinyl formulation rapidly lost its tensile strength as the temperature increased. Furthermore, the coupling, although it showed up favorably in the initial tests, worked loose as the vinyl material aged.

In 1947, Sandee came out with a new hose made of a new vinyl formulation and with a new coupling. Laboratory and field tests proved that they had whipped their previous technical difficulties. The company then began extensive promotion of the hose. Today, the hose is still regularly subjected to control and development tests to assure that a superior product is maintained.

How vinyl hose competes with rubber hose in the open market is shown by the 1950 retail prices announced by one major producer of rubber hose:

10 lb. single braid	
Black rubber covered	$5.25
13½ lb. single braid	
Black Neoprene covered	$6.75
13½ lb. single braid	
Red Neoprene covered	$7.60
15½ lb. double braid	
Green Neoprene covered	$9.25

By comparison, the Sandee Feather Lite 6½-lb. vinyl hose retails for $9.50.

Although Sandee's hose is comparable in price with a quality double braid rubber hose, it is only 40% as heavy as the rubber hose.

Vinyl Takes Abuse

If both the plastic and the rubber hose are handled with extreme care, there will not be a great deal of difference in their age-service properties. However, under the abuse to which most hoses are subjected, the differential in age-service becomes increasingly apparent in favor of the vinyl hose.

A very sound distributor-jobber-dealer relationship, in which every link of the chain of distribution

Long-wearing, light-weight vinyl garden hose is attractively presented at point of sale. Dealers are presented with complete sales kits to aid in merchandising

Hose is clamped around disk which outlines main selling points. Every coil of hose carries guarantee

PHOTOS COURTESY SANDEE MFG. CO.

earns a satisfactory profit, has been set up by Sandee. The company has taken the attitude that plastic hose is a relatively new item and must be vigorously merchandised until established. To back up this view, it is not only advertising to the trade, but is aiding its dealers with point-of-sale material. In addition, a heavy consumer advertising campaign using seven national magazines is being used.

In order to keep costs low, Sandee has developed other items which would use up its scrap material, enabling the company to keep expense rates at reasonable levels throughout the year.

Brushes Keyed to Assembly Costs

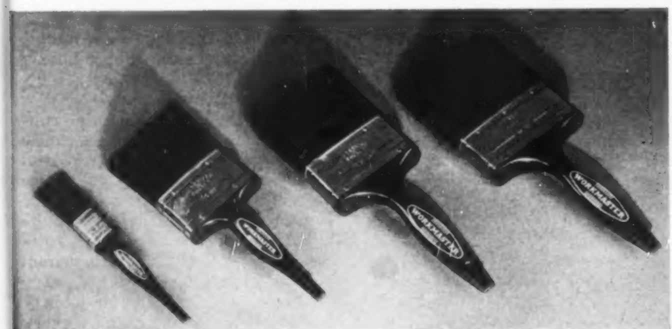
Phenolic handles cost more than wood, but finished brushes about break even because of reduced assembly losses

A COMPLETE line of phenolic paint brush handles has been developed by Sears, Roebuck and Co., to replace its old line of wooden handles.

Although the plastic handles break about even costwise with wood in the finished brush, a direct cost comparison between the two may be misleading because of assembly gains that favor the plastic handles. Wooden handles may split during the final nailing operation, damaging the ferrule, so that the brush is either ruined or must be sold as a second. The plastic handles, on the other hand, assemble with little if any loss.

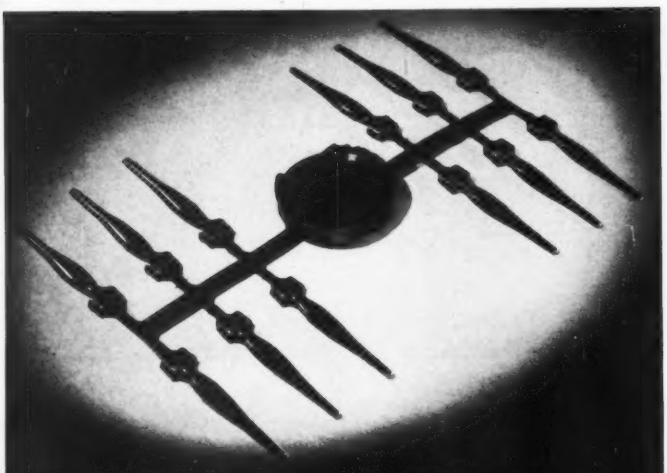
The Sears phenolic handles, which are transfer molded by the Shaw Insulator Co., Irvington, N. J., have excellent dimensional stability and high resistance to such solvents as acetone, kerosene, carbon tetrachloride, turpentine, and gasoline.

Wooden handles present a substantial dimensional control problem since they have a tendency to swell and shrink under changes in humidity. Thus, the brush manufacturer frequently has to dry the wooden handles with heat or expand them with steam to get a satisfactory fit at the time of assembly.



Special features of Sears Roebuck phenolic paint brush handles are molded-in holes for "stringing" and chisel ends which facilitate removal of blisters

Transfer-molded blue phenolic paint brush handles are dimensionally stable, have high resistance to deterioration by such solvents as acetone and kerosene



Precision Made

The phenolic handles are precision made and fit the ferrules closely, thereby facilitating automatic machine assembly in preference to hand fitting and assembly. A molded step positions the ferrules accurately and provides additional anchorage. The ferrules are attached to a molded-in groove in the handle by means of a crimping operation or by the use of rivets driven through molded-in holes.

The use of molded plastics for this application permits a styling that could not be obtained in wood. Included among the many factors that have won consumer acceptance of these paint brush handles are their smooth contours and attractive color. Special features of the handles are molded-in holes for "stringing" and chisel ends which permit the painter to remove bumps and blisters without shifting to other tools.

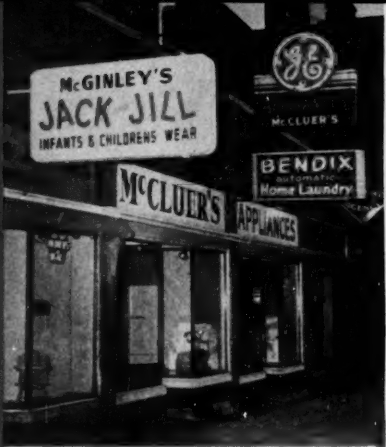
Well Balanced

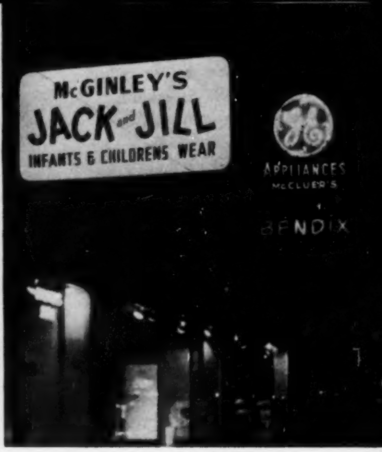
Although the phenolic handles are heavier than those made from wood, they are much better balanced, thus permitting longer use with less arm fatigue.

Today, the plastic paint brush handle volume is rapidly expanding. Another large user of phenolic paint brush handles has stated that he prefers plastics to wood at any price.

PLASTICS BUILD BETTER PRODUCTS AND BETTER VALUES

SIGNS AND DISPLAYS





PHOTOS COURTESY NEON PRODUCTS, INC.

Acrylic-faced Jack & Jill sign is clean-looking and easily legible by day or night. Note contrast with larger neon sign of neighboring appliance store

Acrylic Signs Threaten Neon

New concept in signs gives over-all illumination with increased advertising value. Signs are economical to produce, ship, and operate

ONE OF the largest sign manufacturers in the world is Neon Products, Inc., Lima, Ohio. As its name indicates, the company concentrated for years on the production of neon signs faced with porcelain-enameled metal. But now the company is producing and promoting acrylic-faced signs.

The new signs, sold under the trade name Plastilux, cost much less than neon signs—and are more attractive. They represent, according to Sam Kamin, company president, "the biggest and best development in my 30 years in the sign business."

Plastilux signs consist of formed acrylic face sheets decorated on their inside surfaces and illuminated from the inside. Neon Products uses clear Plexiglas sheets varying in thickness from 3/16 to 5/16 in., depending upon the size of the sign and the planned end use. The sheets are decorated with special acrylic paints manufactured by Keystone Refining Co., Inc., Philadelphia, Pa. The face sheets are mounted in a steel case and lighted from within by Slimline fluorescent lamps.

The main advantage of the Plastilux signs is the savings which they make possible. Their initial cost is far below that of the old porcelain-enameled neon signs, and their lighter weight means lower shipping costs and lower installation costs. Maintenance costs, a big factor with neon signs, are practically eliminated because anyone can replace the standard fluorescent lamps used. In addition, the fluorescent lamps consume less power than high-voltage neon tubes. By way of example, the costs of a three- by six-

Legion emblem on acrylic sign could not be reproduced in neon

COURTESY NEON PRODUCTS, INC.

foot acrylic-faced, fluorescent-lighted sign are compared in the accompanying table with the costs of the same sign in metal and neon.

In addition to the cost advantages, the acrylic sign offers a cleaner, more attractive appearance. The face of the sign is smooth and uncluttered by tubes which can cast shadows and spoil the daylight appearance of the sign. At night, the entire face of the sign lights up instead of just the lettering. This adds to the advertising value of the sign (see the Jack & Jill sign—on preceding page—as compared with the neon sign of the appliance store next to it). The fact that the sign surface is completely lighted also makes it possible to reproduce and illuminate complicated insignia.

Acrylic Illuminated Signs vs Neon

(Comparison of a 3- by 6-ft. Plastilux sign using fluorescent tubes with the same size sign and same copy made of porcelain-enameled metal and illuminated with neon tubing)

	Neon	*Acrylic*	*Saving*
Initial cost (per sign in quantities of 100)	$415	$175	$240
Weight, crated	500 lb.	200 lb.	......
Shipping cost (Lima, Ohio, to Denver, Colo.)	$34.92	$9.31	$25.61
Installation cost	$50 to $60	$25 to $30	$25 to $30
Service cost (per year)	*$25	*Virtually none	Almost $25
Power consumption	720 watts	298 watts	
Power cost (per year, assuming operation 5 hr. per day, 7 days per wk., at 4¢ per KVW)	$65.52	$27.12	$38.40

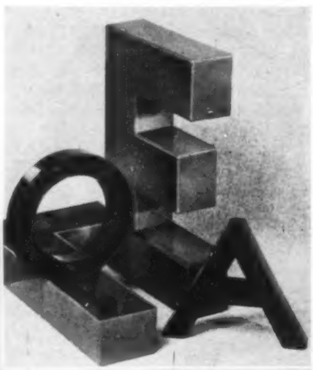
* Neon signs this size are usually serviced on an annual contract for about $25. The acrylic sign needs no such care. The only such cost is normal replacement of lamps at about $1.50 to $1.75 each.

Signs Sell Service

Two large oil companies have chosen acrylic letters and signs for more effective service station advertising

PROBABLY no other industry has adopted acrylic signs as widely as has the oil industry. Filling station identification signs of both the wall and hanging bracket type, the letters identifying the various services offered, and the signs atop the gasoline pumps are all being made of acrylic instead of the metal or glass used previously.

A good example of the trend towards acrylic is the Sunoco filling station shown in accompanying photographs. The Sun Oil Co.'s familiar caduceus trademark, which surmounts the station, is formed of translucent Plexiglas by Steiner Plastics Mfg. Co., Inc., Long Island City, N. Y. Sun has ordered about 500 caduceus emblems for large-scale test installations. Each emblem consists of two blue wings, a twined yellow staff, and a red flame. Most of the emblems are mounted directly on station walls, but some (like the one shown here) are mounted on light boxes and illuminated from behind by cold cathode tubes.



Texaco stations use 13-in. high molded acrylic letters for company name, 6-in. letters to advertise services offered. Slots on back of letters fit over lugs on wall

PHOTOS COURTESY ROHM & HAAS CO.

Formed Letters

Steiner also forms the 8-in. blue Plexiglas letters used to spell out "washing" and "lubrication." The 30-in. letters which spell the name Sunoco are formed by Lee Plastics Co., Inc., Philadelphia, Pa. Translucent blue or yellow acrylic is used for these letters, depending upon the color of the station walls.

Molded Letters

Another example of the use of acrylic in filling station signs is found in the injection molded acrylic letters used by the Texas Co. to replace porcelain-enameled metal letters on the walls of its service stations. The letters are molded by Arnold Brilhart, Ltd., Mineola, N. Y., of Plexiglas molding powders in special red and green colors which match the traditional Texaco colors. The red material is used to mold the 13-in. high T, E, X, A, C, and O letters, and the flanking five-pointed stars. A complete alphabet of 6-in. green letters is molded to

PHOTOS COURTESY ROHM & HAAS CO.

Sunoco station has formed acrylic caduceus emblem with wing-spread of 6 ft. Formed acrylic letters 30 in. high are used for company name, 8-in. letters for "washing" and "lubrication." Caduceus emblem is back-lighted at night

advertise the various services offered and to spell out the names of individual station operators. Keyhole-shaped slots molded of acrylic are cemented to the inside of the letters and are fitted over metal lugs mounted on the station walls. Thus they can be removed easily when the station walls are to be repainted or when new operators take over the station.

Before adopting acrylic, The Texas Co. investigated and tested various sign materials. Acrylic was chosen on the basis of its weather resistance, impact strength, dimensional stability, and color stability. The Plexiglas letters are much lighter than the metal letters they replace. The large acrylic T, for example, weighs 14 oz. as against 2¼ lb. for the metal T. This means lower shipping costs and easier handling and installation. The plastic letters actually cost from one-fifth to less than one-half as much as the metal letters.

Plastics Put 'Plus' in Display

Life Savers' display rack, for use right next to the cash register, is modernized with molded phenolic parts

FOR more than 30 years, display fixtures supplied to retailers by Life Savers Corp., Port Chester, N. Y., have been accorded the choicest point of sale position, right next to the cash register. Now Life Savers is offering nearly one million retail outlets a new display rack with molded phenolic sides. The new rack was designed by Lippincott & Margulies, Inc., New York, N. Y., to replace a metal-sided rack which has been in use for 10 years.

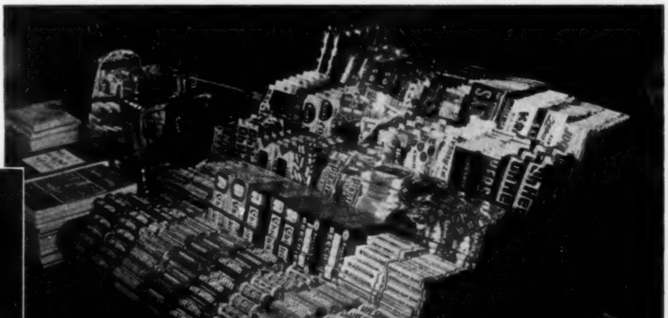
The old steel and chrome fixture had served the company well but, according to Life Savers Advertising Manager Gordon C. Young, "It was beginning to show its age. We wanted to bring out something for the post-war period that would carry a new note in design and quality,

Steel-sided display rack has been replaced by phenolic-sided rack which can be shipped flat, then assembled easily at point of use

OLD

NEW

PHOTOS COURTESY LIPPINCOTT & MARGULIES, INC.



with 'plus' features not included in former racks."

The main feature of the new phenolic-sided rack is the fact that it can be shipped flat and can be assembled and set up by the dealer in about 10 minutes. Thus a Life Savers salesman can carry several knocked-down display racks in the trunk of his car and can deliver one immediately when he finds a retailer who wants one.

The new display stands $9\frac{1}{2}$ in. high, $26\frac{1}{4}$ in. wide, and $26\frac{1}{8}$ in. deep. The shelves and the lithographed label-front are sheet steel; the partitions are glass. Phenolic was chosen for the side pieces because of its eye appeal, ease of maintenance, and because means of assembling the rack could be molded-in to the sides to facilitate assembly in the field.

Each side is molded in one piece with reinforcing ribs and molded-in brass inserts to accommodate wing bolts. Plastimold Corp., Attleboro, Mass., molds the side pieces of a Bakelite general-purpose, wood-flour filled phenolic.

Lighter Letters for Lower Cost

Standard letters, formed of acrylic in a wide range of sizes, are less expensive and easier to install than metal

FORMED acrylic letters for store fronts and other outdoor signs are now being produced in a standard line by Durable Formed Products, Inc., New York, N. Y. The letters cost less than metal ones, are less expensive to install, and can be back-lighted if the end user desires.

The letters range from 2 in. to 3 ft. in height and are formed from Lucite or Plexiglas sheet from 0.100 to $\frac{3}{16}$ in. in thickness. They are available in various transparent, translucent, or opaque colors.

The letters are bonded to a store front with adhesives made by Miracle Adhesives Corp., New York, N. Y. Perforated metal stampings are bonded to the back of each letter and the adhesive is applied to the back of the stamping. When the letter is pressed against the wall surface, the adhesive is forced through the perforations. This results in a series of rivet-like formations when the adhesive hardens.

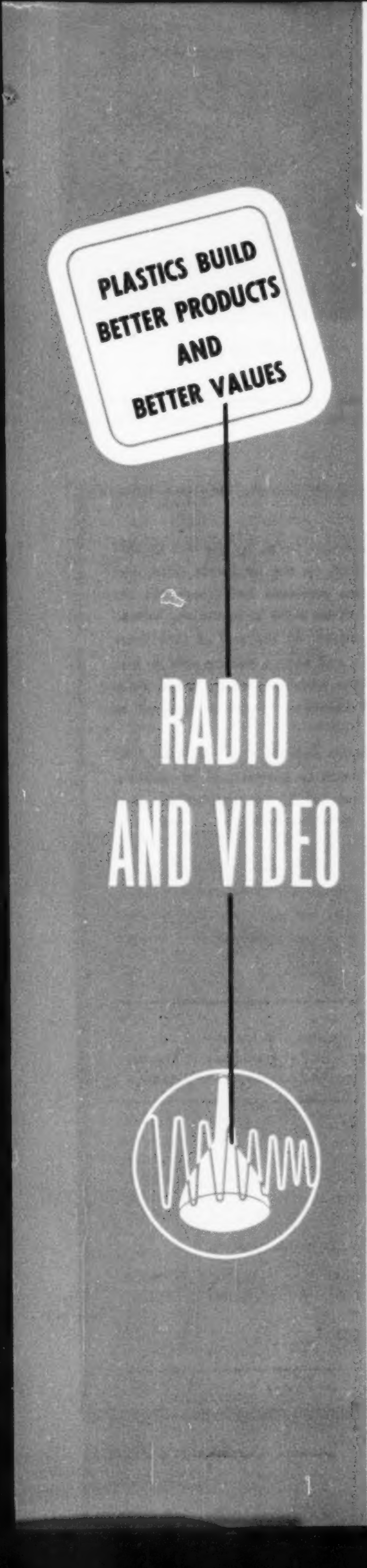
Light Weight an Advantage

Durable's 2-ft. letter sells for about one-third the cost of a solid steel letter the same size. Punched-out aluminum letters cost about 10% less than acrylic. However, weight is an important factor, and therein lies the chief advantage of acrylic. Durable's acrylic letters range from $\frac{1}{2}$ oz. for the 2-in. letters to 5 lb. for the 3-ft. character. This is about one-fifth the weight of cast aluminum letters of equal size—and this favorably affects shipping and installation costs.

An example of the economy of the acrylic letters from the end users' standpoint is the new Associated Food Stores, Inc. store in Rego Park, N. Y. The sign on the front of the store has ten 2-ft. letters, eleven 18-in. letters, and ten 3-in. letters. The total cost for the job, including installation costs, was less than $400. The estimate for doing the same job with solid aluminum letters was $1000!

Formed acrylic letter 3 ft. high weighs only 5 lb., can be backlighted. Food store sign has 31 letters, cost only $400, including installation. To do the same job with solid aluminum letters would have cost store owner $1000

PHOTOS COURTESY DURABLE FORMED PRODUCTS, INC.



Philco's Approach to Plastics

Despite ownership of facilities for making wooden cabinets, from trees to factories, Philco can buy plastic cabinets for 15% less

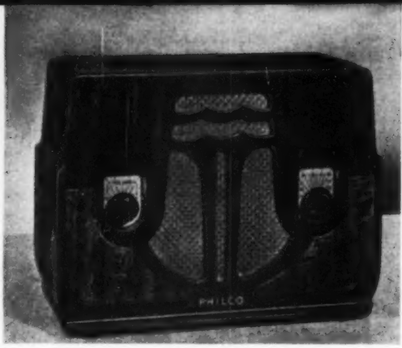
THERE is probably no radio manufacturer who can produce wooden radio cabinets more economically than Philco Corp. There are no middlemen involved in the production of Philco's wooden cabinets because Philco owns its own timber stands, saw mills, and cabinet factories. But even Philco can buy plastic cabinets from custom molders for about 15% less than the cost of wooden cabinets!

Almost as important as the cost angle is the production rate possible with plastic cabinets. Once a new model is introduced, production must be rapid—and cabinets cannot be produced as fast with any other material as they can be of plastic.

Philco's earliest table model radios were housed in metal cabinets. Later, Philco began to use wooden cabinets. Prior to 1937, the only plastics applications in Philco receiving sets were phenolic control knobs, laminated phenolic dials, a few cellulose acetate escutcheons, and socket bases and insulators made of either laminated or molded phenolic.

The first Philco radio with a molded plastic cabinet was the

Name of Part	*Plastic used*	*Supplier*
Model 2500 Projection-Type Television Receiver		
Coating on screen	Cellulose lacquer	Various sources
Station selector holders	Clear acrylic	Anthony Breau Plastic Industries, Philadelphia, Pa.
Control knobs	Cellulose acetate butyrate	Bridgeport Moulded Products, Inc., Fairfield, Conn.
Pushbuttons	Cellulose acetate butyrate	Erie Resistor Corp., Erie, Pa.
Pushbutton caps	Polystyrene	Erie Resistor Corp.
Base plate insulator	Polystyrene	The Sillcocks-Miller Co., Maplewood, N. J.
H. V. insulator	Vinyl	Sillcocks-Miller Co.
Tube sockets	Melamine or phenolic	Various sources
Model 1104-MA Table Model Television Receiver		
Cabinet	General purpose phenolic	American Insulator Corp., New Freedom, Pa.; General Industries Co., Elyria, Ohio
Control knobs	Butyrate	Santay Corp., Chicago
Insulators	Vinyl	Colvin-Friedman Co., Springfield, N. J.
Picture tube cover	Butyral safety glass	Various sources
Model M-20 Record Changer		
Trip finger	Nylon	Sillcocks-Miller Co.
Insulators	Vinyl	Colvin-Friedman Co.
Tone arm dampers	Nitrocellulose	Du Pont
Crystal case	Phenolic	American Insulator
Adaptor disks	Polystyrene	American Insulator



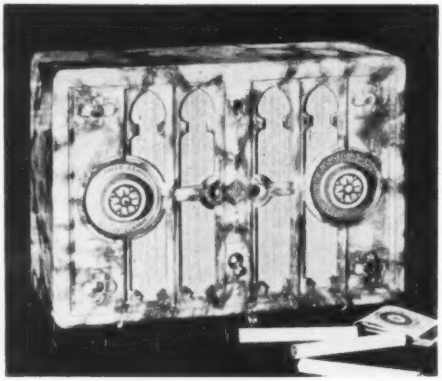
ALL PHOTOS COURTESY PHILCO CORP.

1929

Early Philco "neutrodyne-plus" radio was a table model with a metal cabinet—had a separate speaker larger than complete modern table unit

1936

Last of the wooden-cabinet models. Some Philco sets prior to 1937 included plastics accessories



International Radio's first fully-molded plastic cabinet in 1933 paved way to rapid mass production

Back in 1933 came a revolution in table model radio cabinets. The set that laid the foundation for this sweeping change was International Radio's first fully-molded plastic cabinet, the Kadette, molded of urea material in an onyx effect, by Chicago Molded Products Corp., Chicago, Ill.

This cabinet, of attractive design even by modern standards, opened the eyes of the radio industry to the advantages of a uniform, mass-produced cabinet of functional design, and the substitution of a rapidly molded unit of accurate dimensions for a cabinet slowly and painstakingly produced of wood by expensive hand operations.

By 1939—but let the figures in the tabulation below tell the story.

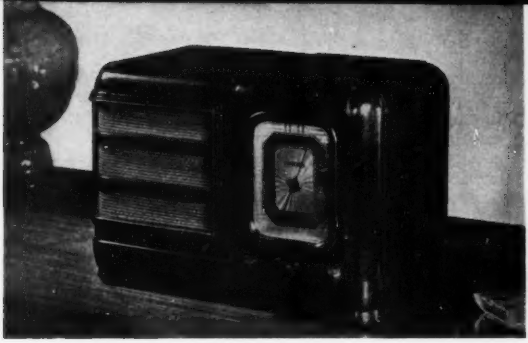
In television, the growth record is even more spectacular. According to a recent address by H. C. Bonfig, vice president, Zenith Radio Corp., by the end of 1946 there were eight stations on the air in six cities and more than 10,000 video receivers had been sold. At the end of 1947, 18 stations were in operation, broadcasting to 142,000 receivers. At the end of 1948 there were 51 video stations and over a million sets in use. In November 1949 there were 88 stations in 57 cities with nearly 2,700,000 television receivers reported in operation.

Early last year plastics entered the television field in cabinets, in tube bases, in masks, and in controls. The cabinets were produced by overcoming the past size limitations of compression molding . . . and huge new markets opened to plastics.

In the television field, also the war-born plastic polyethylene came into prominence. Fathered by radar, television could not exist without coaxial cable; and that cable in turn depends upon polyethylene insulation.

Year	Total radio sets, including phonographs, automobile radios, table models	Table or portable models	Plastic cabinets
1937	8,083,000	3,580,000	904,000
1938	7,141,000	3,575,000	1,420,000
1939	10,759,000	5,400,000	3,200,000
1940	11,859,000	5,516,000	3,600,000
1941	13,642,000	5,988,000	4,000,000[a]
1942	4,307,000		2,200,000[a]
1943-1945 No civilian radio production			
1946	16,000,000	10,500,000	7,700,000[a]
1947	20,000,000	13,000,000	9,400,000[a]
1948	16,500,000		
1949 (½ yr.)	4,750,000		

[a] Estimated



1937

Philco's first model produced with a plastic cabinet was molded of phenolic. Mold was sent overseas and is still being used

1950

Philco post-war radios, such as this model 621, continue to employ plastics for cabinets of table sets and for small parts

Model 14CB, initially produced in 1937, after several years of investigation by Philco designers and furniture engineers. The cabinet was designed by Jan Streng and molded of phenolic by Plastimold Corp., Attleboro, Mass. (then known as Associated Attleboro Manufacturers), and later by American Insulator Corp., New Freedom, Pa. The mold was run for several years in this country, then sent abroad for use by Philco licensees. Twelve years after its original introduction, the mold was in New Zealand.

In 1938, Philco introduced its Models TP-10 and TP-11, table models with two-tone cabinets and with push-button tuning in the TP-11. The dark cabinets were molded of phenolic and the light-colored grilles and dials were molded of cellulose acetate or cellulose acetate butyrate. The control knobs were acetate and the push-buttons phenolic. The following year Philco added a phenolic back with a built-in aerial and a phenolic carrying handle to the TP-10 and TP-11 models to make the models TP-20 and TP-21 the first Philco table model radios with built-in aerials. The cabinets for all these models were molded by Plastimold Corp.

Philco's Model 89C, introduced in 1940, was a portable with a built-in aerial in the shoulder strap. It was also Philco's first cellulose acetate cabinet. The cabinet was molded in two halves, and part of the cabinet was covered with leather. The cabinet and the cellulose acetate control knobs for the set were molded by The Standard Products Co., Plastics Div., St. Clair, Mich.

A good example of the basic soundness of Philco's plastic cabinet designs is the fate of the molds for

Increasingly larger use of plastics in Philco units followed introduction of television receivers, some of whose cabinets weighed 12 lbs.

Development of television has presented problems which require new applications of plastics — such as in this Philco model 1104-MA

the Models PT-4 and PT-10, first introduced in 1940. The PT-10 had a mottled phenolic cabinet and matching knobs; the PT-4 was the same cabinet with a painted phenolic cabinet and matching urea knobs. These models were produced in this country for a few years by American Insulator Corp., and by Plastimold. One mold for this model is now in use in Brazil, one is in Argentina, and a third is in England.

In its post-war models, Philco has continued to use plastics for the cabinets of table model radios and for many small parts. On a poundage basis, Philco's consumption of plastics increased greatly in 1949 when its phenolic television cabinets, some of which weigh 12 lb. apiece, went into production. The manner in which Philco uses plastics today is illustrated by the chart on page 149 which lists the various applications in Philco's Model 2500 projection-type television receiver, the Model 1104-MA television receiver, and the M-20 record changer which is a part of many console models.

As the applications listed on the chart indicate, the advent of television has given rise to problems which have been solved with new applications of plastics—applications which were not necessary in AM radio receivers. These additional applications spell more and more pounds of plastics in Philco's future production.

Selected on Performance

Television picture-tube mask of phenolic costs more than metal mask but only plastic would do the required job

ALTHOUGH plastics have become a major factor in television receiver cabinets, some of their most noteworthy television applications consist of components which serve functional purposes within the set. In this category are the molded phenolic picture-tube masks adopted by RCA for its 16-in. direct view receivers. In this instance, the plastic part was specified despite its higher cost, because it was the only material which would satisfactorily meet the rigorous operating conditions.

In its initial post-war television sets, RCA used removable fronts permitting the kinescope to be slipped in and out of place. Choice of material for the tube mask made little difference from the technical standpoint. Accordingly, wood was employed due to its ease of handling and design flexibility.

Later, it became necessary to ship the tubes mounted in the sets. Construction was modified to include a fixed cabinet front, with the tube mounted directly to the mask behind the safety glass. At this point, a tensile strength requirement was introduced and metal was selected because of ease of manufacture and favorable cost factors.

Plastic Wins Over Glass

RCA's introduction of the 16-in. picture tube resulted in two new problems—the method of tube mounting to be employed and the very high voltages involved, making insulation mandatory in the tube mask. There is a charge of 18 KVA on the metal shell of a 16-in. tube and the tube comes in close proximity with the mask. This naturally ruled out metal for 16-in. masks.

With metal unsuitable for the application, RCA engineers knew, from their experience in working with high voltages, that the choice lay between plastic and glass. Their ultimate selection of molded phenolic was based purely on performance, even though in this instance costs were approximately $1.35 over the mask used on earlier models. Reports RCA: "The voltage problem did not allow consideration of cost."

The RCA 16-in. masks, molded of Bakelite phenolic material, are supplied by Mack Molding Co., Inc., Wayne, N. J.

Molded phenolic was chosen as the material for tube masks on the 16-in. RCA television set when development of high voltage made use of plastic mandatory

COURTESY RADIO CORP. OF AMERICA

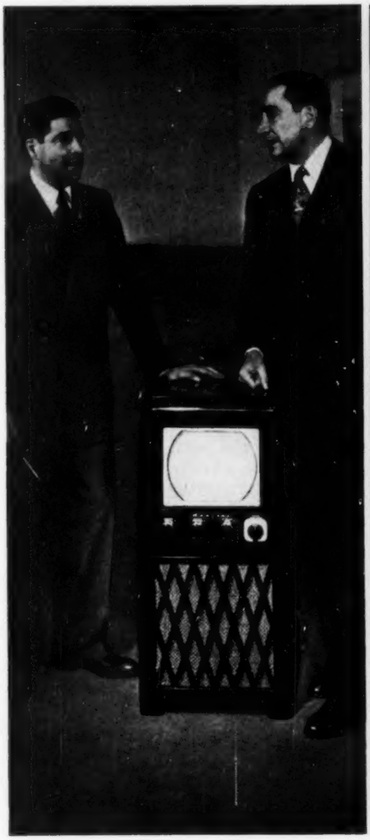
Admiral Cabinets Make History

Largest commercially-molded pieces permit drastic reduction in television set cost. Still larger pieces to come

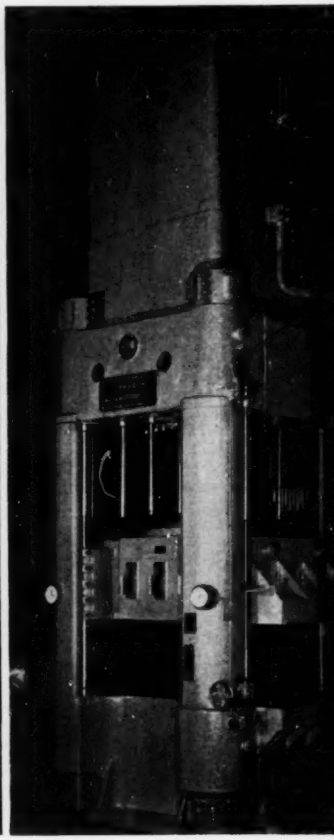
IN May, 1949, Ross D. Siragusa, president of Admiral Corp., Chicago, Ill., tossed a 35-lb. bombshell into the booming television market. It was a boldly conceived one-piece molded phenolic cabinet, 16¾ in. wide, 32 in. high, and 18 in. deep, turned out at the rate of one every six minutes on a 2000-ton press originally designed for drawing shell casings. Thanks to the all-around production savings made possible by this cabinet, Admiral was able to offer the public a handsomely designed console-type television set with 10-in. screen for $100 less than any comparable set in the field.

Fast and smooth production, the absence of finishing costs except for slight flash removal, ease and economy of handling on the assembly line, the durability of the cabinet in use, and public acceptance, proved the wisdom of the development.

This epochal cabinet, the largest plastic part ever molded commercially in quantity in the United States, marked the culmination of a long-term policy undertaken some time ago by Mr. Siragusa and his brother, Dom Siragusa, president of Molded Products Corp., Chicago, to utilize the full advantage of plastic molding in the production of larger pieces. Now Admiral is more than doubling production of this model. Molded Products recently acquired a second and still larger press which is now producing these cabinets—a 2500-ton HPM which, with modifications, has a gross tonnage of approximately 3000. With both presses operating, Molded Products is investigating the possibility of running two dies simultaneously in each press, which would boost the production rate to a point where four cabinets would be molded approximately every 12 minutes.



Flanking their television set — featuring a 35-lb. molded phenolic cabinet — are Dom Siragusa, left, president of Molded Products Corp., and brother Ross D., of Admiral Corp.



Recently acquired by Admiral for molding its phenolic television cabinet is this 2500-ton press which can produce two consoles per cycle

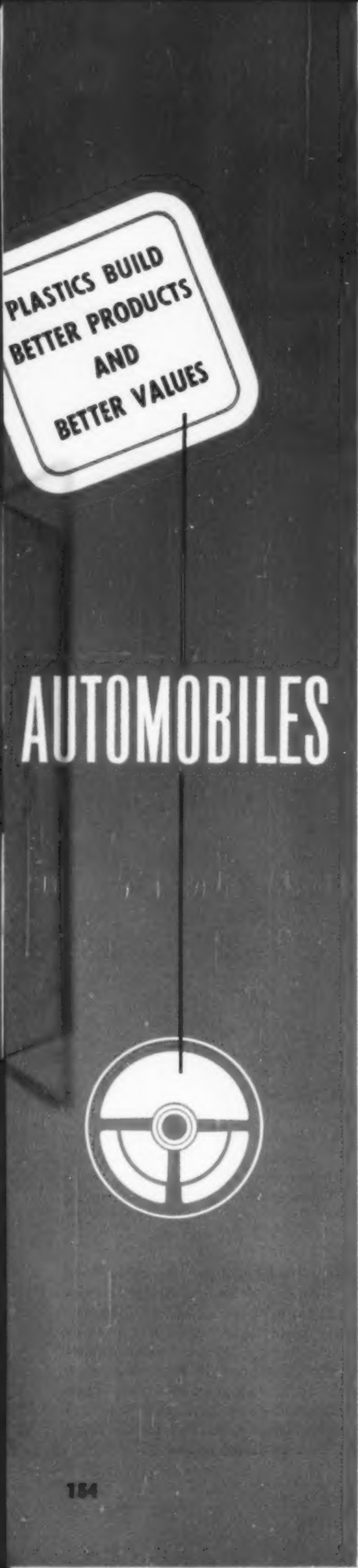
Compared with Wood

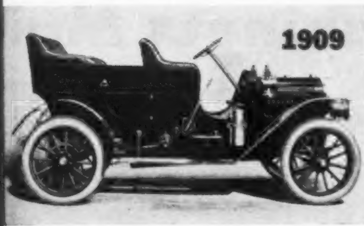
MODERN PLASTICS has learned from an independent furniture designer that at a rate of 160 cabinets per 8-hour day the two presses are equalling the possible output of a well-organized wood cabinet-making shop with nine employees.

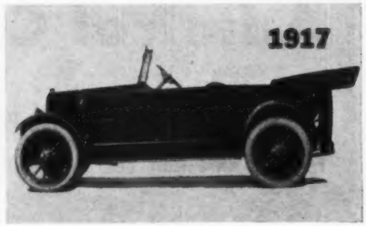
With no seams, joints, nails, glue, or screws to work loose, the new unit is substantially stronger than wood.

Molds consist of seven main sections and weigh 16,000 pounds. The rapid molding cycle obtained is attributable largely to electronic preheating, which raises the temperature of the ½-lb. preforms to 175°F. in 1 minute. Material is "long-draw", general-purpose phenolic which is modified for improved flow.

Commenting on the history-making Admiral cabinets, Dom Siragusa recently declared: "Old conceptions of size limitations for compression-molded pieces are definitely out, now that basic principles have been established—and still only the surface has been scratched in the compression molding industry."







The 1909 Rambler had phenolic electrical parts; 1917 Nash had cellulose nitrate side curtains and timing gear made of phenolic laminate. Modern Nash (right) has many plastic parts, as shown in photo at bottom of opposite page

With Nash, Plastics

IN ITS modern plant at Kenosha, Wis., Nash Motors, a division of Nash-Kelvinator Corp., can turn out nearly 1000 passenger cars and trucks per day. The original Nash car was the successor to the famous Rambler, which first appeared in 1902 as a product of the Jefferey Motor Car Co. In 1916, Charles Nash resigned the presidency of General Motors to acquire the Jefferey organization and produced the first Nash-designed machine in 1917.

By 1909, Rambler owners could buy, as optional equipment, a mohair top with cellulose nitrate side curtains. When Bakelite phenolic appeared in 1909, it began to find its way into the Rambler cars, primarily in electrical applications. Among such pioneer uses were fuse blocks and switch blocks, which had formerly been stamped from fiber sheet. Laminated phenolic stock was adopted for such parts because of its good electrical properties and superior water resistance.

The 1917 Nash had cellulose nitrate curtains that opened with the doors. This model also boasted a crank shaft pinion (timing) gear of Condensite, a phenolic-impregnated cloth laminate, which was quiet in operation and eliminated the problem of backlash common with brass and steel gears.

In the early 20's, Nash began using a Stewart-Warner vacuum tank in the fuel system, containing an inner dump tank with flapper valves fabricated from Bakelite punching stock which withstood contact with gasoline. With the introduction of fuel pumps, vacuum tanks became no longer necessary, but molded phenolic electrical parts, such as distributor heads, became a standard application early in the history of Nash cars.

Molded phenolic parts also began to show up here and there on the interior of the car as knobs, buttons, etc., during the 20's. However, one of the most important developments of this period for Nash, as for other manufacturers, was the shatterproof windshield, which utilized a thin layer of plastic (first nitrate, then cellulose acetate, and finally vinyl butyral) material, sandwiched between two layers of glass.

Important strides were made with the urea resins, beginning around 1930, and Nash was quick to take advantage of their color, translucence, and surface hardness. During this period, Nash made frequent use of molded urea components such as dome and pillar lights and instrument dial parts.

Then came the rapid development of improved thermoplastic molding materials, with Nash among the first to apply them. The 1939 Nash had a Tenite II horn button molded in clear material and finished in a cream color on the reverse side, with the Nash name in script and filled with red for pleasing contrast. This type of button maintained its appearance much longer than one of painted metal, since the design was protected by the smooth outer plastic surface.

Among the early butyrate parts to grace Nash interiors were a group of instrument board components produced for the 1940 Nash by Cardinal Corp., Evansville, Ind. These pieces, employing the three-dimensional molding process, were painted on the reverse side.

1949

is a Policy

From the very beginning, Nash Motors has embraced and developed the use of plastics in all parts of the car

Nash made further use of the three-dimensional molding technique on various models in the immediate pre-war period, with additional horn buttons and medallions. In 1941, a new design approach led to a clear acrylic horn ring measuring 9½ in. in diameter and weighing around 5 ounces.

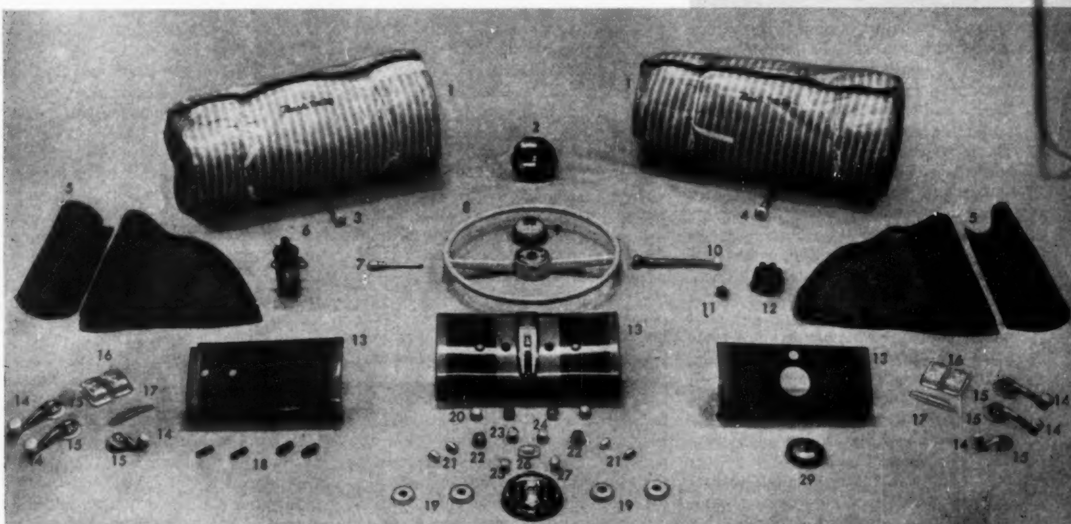
In 1942, with metal supplies tightening, Nash adopted a molded plastic hood ornament to replace the former chrome-plated brass ornament. Since that time, the company has used both metal and plastic for this component. The three-dimensional acrylic ornament for the 1949 and 1950 models is molded by Kent Plastics Corp., Evansville, Ind.

In 1942, Nash took a bold step which had important implications for plastics in the auto industry. This pioneer application was a polystyrene horn medallion, which is

Plastic Parts in Nash Cars

The various plastic parts used in current model Nash cars are shown in the photograph at the bottom of the page and identified by numbers corresponding with those in the following list:

1—twin bed mattress covers (2)
2—speedometer and instrument cluster
3—hood latch knob
4—over-drive control knob
5—window screens (4)
6—ignition coil cap
7—directional signal knob
8—steering wheel
9—steering wheel cap
10—shift lever knob
11—distributor rotor
12—distributor cap
13—dash panel over-lays (3)
14—window regulator knobs (6)
15—window regulator escutcheons (6)
16—parking light lenses (2)
17—license light lenses (2)
18—wire connectors (4)
19—door handle escutcheons (4)
20—radio control knobs (4)
21—ash tray pulls (4)
22—heater and defroster knobs (2)
23—speaker volume control knob
24—windshield wiper control knob
25—aerial control knob
26—dome light switch
27—cowl vent knob
28—hood front medallion
29—clock opening cover



The automotive market for plastics has grown tremendously through the years, both from the standpoint of more plastics per car and through the enormous growth of the automotive industry itself. In 1941, when 3,800,000 cars were produced by U. S. manufacturers, the average amount of plastic per car was 7½ pounds. In 1949, when output exceeded 5 million cars, the average amount of plastics per unit had risen to an estimated 14 pounds.

The earliest recorded use of a plastic material by the auto industry was a front storm curtain with a Celluloid (cellulose nitrate) windshield, used on the one-cylinder Olds runabout in 1905. Celluloid was later adopted generally for demountable side curtains.

In 1911 the first electric starter, invented by Charles F. Kettering, made its debut on Cadillac cars. Mr. Kettering has declared that without Dr. Baekeland's new thermosetting phenolic resin, he could not have perfected the electric starting, lighting, and ignition system which was to revolutionize motoring.

In 1913, distributors and distributor heads were made of phenolic material, to replace parts formerly made of hard rubber. Two years later, high pressure laminate (canvas impregnated with phenolic) moved into the timing mechanism. By 1918, the phenolics had found their way into such items as gear shift knobs, handles, and gas tank caps.

By 1940, the average auto had some 50 different plastic applications. As war shortages tightened, auto makers began to use plastics more widely as alternate materials. In 1942, there were more than 120 applications in the average car and one Chrysler model had 232 individual plastic parts.

Plastic steering wheels are the largest single plastic application generally adopted by the automotive manufacturers; cellulose acetate butyrate is the preferred material for this application. The industry has found an ideal interlayer material for safety glass in polyvinyl butyrate. This has been a standard application for many years.

Auto makers utilize tremendous quantities of cellulose acetate and cellulose acetate butyrate for knobs of all kinds as well as glove compartment and instrument panel ornamental details, garnish moldings, escutcheons, and similar parts.

A significant development of recent years has been the steadily increasing use of molded acrylic parts for exterior applications, such as components of hood ornaments, front and rear deck nameplates and medallions, and lenses for stop lights, tail lights, parking lights, and license lights. Acrylic has also become the preferred material for steering post medallions, which have replaced the old "horn button."

The versatile vinyls are rapidly broadening their applications in this important market. Chrysler Corp. recently adopted an extruded elastomeric vinyl fender welting for the troublesome joint between rear fenders and body. Ford Motor Co. is now using extruded vinyl upholstery piping. Packard Motor Car Co. brought out a new station sedan model in 1948 with woven saran upholstery, trimmed with vinyl chloride-coated fabric. In Hudson's 1950 Pacemaker, unsupported vinyl sheeting is used extensively as inner door linings, linings for rear passenger compartment, and for the covering of the entire back of the front seat.

Many plastic applications on the modern motor car are either unseen or not readily recognized as plastics. One example is rivetless brake linings bonded with phenolic; another is the alkyds, which are used in paints to give today's motor car its enduring "show room sparkle."

believed to have marked the first use of this material in motor cars.

The medallion was molded in clear transparent material with the Nash emblem debossed into the underside and filled in red and gold. The cap was used with a de luxe white Tenite two-spoke steering wheel and was styled to form an integral part of the steering wheel design. It proved to be the forerunner of other interior parts on which Nash specified polystyrene because of its clarity, dimensional stability, and low cost.

The company's development program on polystyrene was intensified after the war, and on the 1949 models, Nash made plastics history by using three large instrument panel overlays of this material weighing a total of nearly 40 ounces.

In its determination to adapt polystyrene to automotive uses, Nash set up a broad research program, in cooperation with material suppliers, to find a preparation which would improve the solvent resistance of the material, increase its abrasion resistance, and reduce electrostatic attraction. Nash Motors commissioned the Bjorksten Research Laboratories, Chicago, Ill., to work on this project. The result was the production of Logoquant, a material which when used as a surface coating gives the desired properties to the plastic. Manufacturing rights on Logoquant were licensed by Nash to the Bee Chemical Co., Chicago, Ill.

The large instrument panel overlays for Nash were molded of Styron 637 by the Plastics Div. of General American Transportation Corp., Chicago, which also set up special facilities permitting the painting and Logoquanting of as many as 3000 parts per 8-hour day. Nash reports that the panels proved entirely acceptable under service conditions.

The company's engineers are also interested in the extension of polystyrene to exterior applications, such as tail light and parking lamp lenses and hood ornaments. Nash is now using an acrylic hood front ornament and will replace glass lenses in tail lights with molded acrylic in 1950. Its engineers are hopeful, however, that development of improved polystyrene formulations, combined with the Logoquant treatment, will soon permit the use of this lower-cost material on such parts without sacrificing present performance and weathering standards.

There is considerably more to the Nash plastic story—much of it concerning extensive research work involving vinyl materials in automotive seating applications, acrylic sheeting for glazing, and other long-range projects. But the main theme of the story is that Nash has constantly found new and better ways to improve the performance, appearance and competitive position of its cars by intelligent use of plastics.

The new Ford has newly-designed crest, molded of acrylic, as front hood ornament. Parking lights have lenses molded of acrylic in place of glass lenses

Ford crest used as front ornament is also used on trunk. Tail light lenses are acrylic

More Plastics in the '50 Ford

Greater utility and style, plus manufacturing economies, result in a broadening of plastics uses

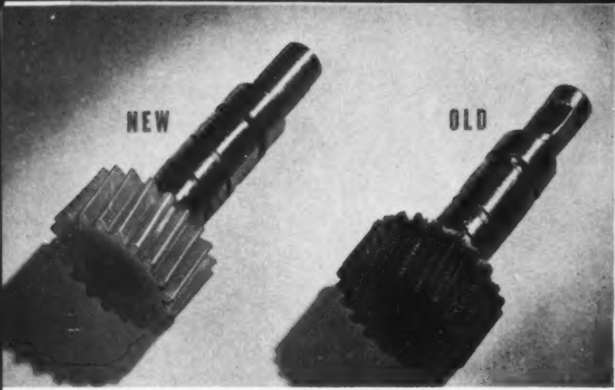
Instrument panel control knobs are molded of cellulose acetate butyrate and have concave chrome inserts. Steering wheel medallion is molded of acrylic

FORD passenger cars for 1950 reflect important increases in plastic components in the interest of improved appearance, better performance, and reduction of costs.

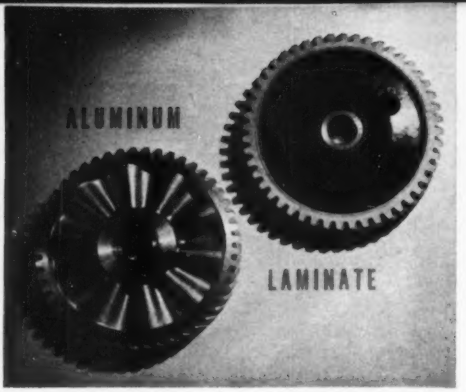
In addition to a complete changeover from glass to molded acrylic lenses for tail lamps, parking lights, and back-up lights, Ford is using a restyled clear acrylic hood ornament, a butyrate window regulator, and instrument panel control knobs with concave chrome inserts. The new, simplified heater control has an illuminated semi-circular front of clear plastic material. Molded acrylic appears in the three-dimensional steering wheel medallion by Gits Molding Corp., Chicago, Ill., and in the colorful new Ford crest, used on both the hood front and the center of the trunk lid. The latter parts are by Hoosier-Cardinal Corp., Evansville, Ind.

Camshaft timing gears on both the V-8 and 6-cylinder engines for 1950 are of phenolic-impregnated cloth laminate. They were specified to replace aluminum gears because of their quieter operation, improved mesh, and superior wear resistance.

Molded nylon makes its appear-



Nylon speedometer take-off gear (left) is molded directly on the shaft. It eliminates assembly operations, resists wear better



Phenolic laminate timing gear has replaced aluminum because of its quieter operation, superior wear resistance

ance as a sliding shoe in the new Ford door-lock striker assembly and in the speedometer take-off gear, which operates off the transmission to drive the speedometer cable. The nylon gear was tested to the equivalent of 100,000 miles at 80 mph. The former gear required assembly of laminate blank to shaft, tooth hobbing, and manual stamping for identification; the nylon gear, molded directly on the shaft, can be held to closer tolerances, has superior wear resistance, and comes from the die with all necessary identification molded in.

Ford is continuing the use of extruded elastomeric vinyl gimp binding for upholstery in the 1950 cars. The company reports that the vinyl binding, available in various colors to harmonize with interior color treatments, has better abrasion resistance than coated fabric gimp, affords greater seam strength, and is more easily applied to upholstery contours because of its flexibility.

Easy on the Eyes

Colored transparent acrylic in visors is more expensive than metal but offers greater and important advantages

LARGER and more steeply sloped windshields in recent automobiles have caused motorists to complain of sunlight and glare. Metal visors made to offset the complaint were faulty in appearance, and presented further problems because they were opaque, blocking the driver's vision and making it particularly hard to see overhead traffic signals.

Out of this fault of a metal, a big business has been built in Lucite visors. Vision-Visor Corp. of America, Chicago, Ill., selling through automobile jobbers, is making and distributing plastic visors on a national basis in the United States and Canada, where a branch plant has been established.

Within one year the company's sales reached the six-figure mark. Moreover, it has become one of the nation's largest users of acrylic material in both sheet and molding crystal form, with a monthly production of approximately 7500 visors, each containing approximately 3 lb. of plastic.

Acrylic sun visors do not have to be painted and do not block driver's vision as do metal visors. Transparent material eliminates glare, filters sun's rays

Range of Prices

The visors are retailed at \$34.50, \$29.50, and \$24.35 for the three basic models offered, providing "a visor for every purse." The top bracket model utilizes panels fabricated of 3/8-in. Lucite sheeting, while the others both use panels injection molded of Lucite. These panels, embodying a curved decorative bead which provides added rigidity, weigh approximately 26 oz. for each half and are molded by Santay Corp. and Cruver Mfg. Co., both of Chicago, Ill. All models are available in red, green, or blue.

Considerably higher in material cost than visors stamped from steel or aluminum sheets, the plastic visors offer sales-encouraging properties. Whereas most of the metal vi-

sors require finishing to match the car, following installation, the acrylic visors — in their standard colors — are easily assembled and installed by the purchaser himself. Without blocking vision, the Lucite visor eliminates glare, diffuses bright lights, cuts driving fatigue, and increases safety. By filtering out harsh infra-red sun rays, it keeps the car cool in summer and minimizes snow glare in winter.

The Vision-Visor protects windshields against heavy rains, sleet, or snow, and requires only occasional waxing to keep it looking new. But its crowning virtue — the quality that couldn't be duplicated in any other material having the necessary physical characteristics — is its transparency.

Street Marking Costs Cut

With a life expectancy of four to six years, plastic traffic-line markers are far more economical than paint

PAINTED street marking lines have always given traffic engineers a headache. They constantly disappear and must be repainted twice a year. And while they are being repainted, congestion results because traffic must be diverted until paint lines are dry.

The city of Pendleton, Ore., a typical community with a population of 16,000 and with a normal traffic flow, has completed cost tests on the use of a new plastic disk street marker. The results, based on the lowest life expectancy of the disks, are shown in the panel herewith.

Molded by Beaman Plastic Products Co., Portland, Ore., for the Traffic Safety Supply Corp., Portland, these Tenite II cellulose acetate butyrate disks are 4½ in. in diameter, white or yellow in color, and slightly convex on top with a center counter-sink.

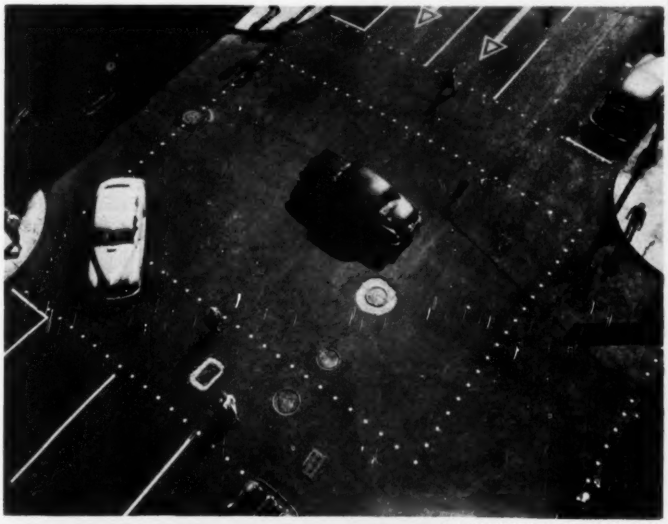
Called "Dur-O-Line" markers, these disks may be mounted on either asphalt or concrete surfaces by means of a hot mastic adhesive, and bolts or pins driven through the countersunk center into the road.

Tough and permanently yellow, the easily installed markers may be run over by automobiles immediately after laying. Their life is between four to six years. Designed to withstand the severest treatment, they will carry 15 times the maximum legal load limit. A two-man crew can lay 100 markers in one hour on 2-foot centers. Extremely visible, the plastic markers can be seen two blocks away.

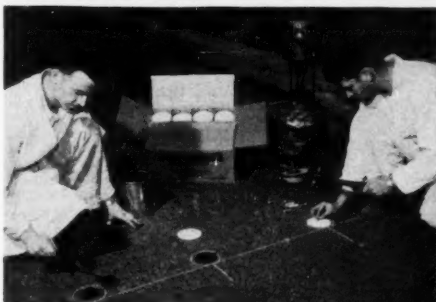
Comparative Economics of Use of "Dur-O-Line" Markers vs. Paint in Pendleton, Ore., Based on Minimum Life Expectancy of Four Years

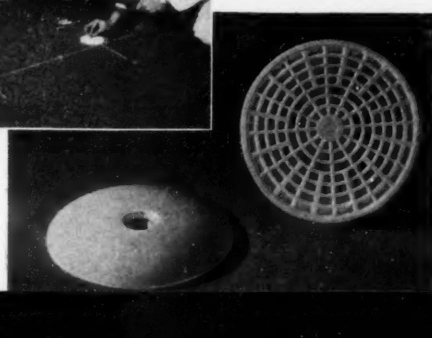
579 parking stalls	2895 markers
16 intersections (crosswalks)	2401 markers
Total plastic markers (all 2-ft. centers)	5296
6 bags adhesive material @ .17½ lb.	$ 78.75
5296 plastic markers @ .215	1138.64
Labor (2 men—7 days @ $10.00 a day)	140.00
Miscellaneous contingencies: pins, etc.	100.00
Total plastic marker expense	$1457.39
Pendleton's cost for paint and labor (2 paintings per year), four-year period or total of 84,736 ft.	$3000.00

Over 50% savings in four years



COURTESY BEAMAN PLASTIC PRODUCTS CO.





Traffic markers molded of butyrate are bonded to road surface with mastic and bolts or pins. They are ribbed on bottom surface for strength

PLASTICS BUILD
BETTER PRODUCTS
AND
BETTER VALUES

PREMIUMS

COURTESY QUAKER OATS CO.

Close resemblance of salt shaker to Aunt Jemima trade mark makes the premium valuable for its remembrance advertising. Shakers are styrene

Molded by

ONE of the outstanding examples of successful premium promotion using plastic premiums is the recent series of campaigns by the Quaker Oats Co., Chicago, Ill. The campaigns were built around premiums designed and molded by F & F Mold & Die Works, Dayton, Ohio. The distinctive feature of the premiums used is the fact that each was designed to promote a specific product and resembles its trade mark.

Syrup Pitcher for Pancakes

The first of these premiums was a syrup pitcher designed to promote Quaker Oats Co.'s Aunt Jemima pancake mix. A syrup pitcher was considered to be an ideal premium for a pancake mix because of the close tie-in between its use and the use of the product. To make the tie-in closer and to give the premium added value to the company as a piece of remembrance advertising, the pitcher was designed in the shape of Aunt Jemima.

The pitcher is molded of Lustrex heat-resistant polystyrene in four parts (two halves of the body and two halves of the lid), then decorated with seven spray-painting operations. It was introduced in the fall of 1948 as a self-liquidating mail-in premium at 35¢ plus one box top. The item proved to be so popular that the mail-in offer had to be discontinued while an inventory was accumulated. The promotion was resumed early in 1949 as a combined mail-in and over-the-counter offer, and the syrup pitcher became the largest selling adult premium of that season.

In view of the success of the syrup pitcher, Quaker Oats had F & F Mold & Die Works produce a polystyrene salt and pepper shaker set in the shape of Aunt Jemima and Uncle Mose. The sets were introduced in the fall of 1949 in a combined over-the-counter and mail-in offer. The premium is self-liquidating at 50¢, and the promotion was so popular with retailers that it is being repeated early in 1950.

Quaker Oats Co. also applied the principle of reproducing trade marks to a promotion for its Quaker Oats. The premium chosen for this campaign is a cream pitcher or drinking mug in the shape of the head of Mr. Quaker. The Lustrex mug was designed by F & F and introduced in the fall of 1949.

Dishes for Cereal

As a premium with a close product tie-in, Wheatena Corp., Rahway, N. J., is using breakfast dishes molded of Lustrex heat-resistant styrene by Rogers Plastic Corp.,

COURTESY MONSANTO CHEMICAL CO.

Over a billion dollars a year—that is the premium market in the United States. The market is growing rapidly—and plastics' share of that market is growing even more rapidly. In 1949, according to some experts, plastic premiums captured about half the total premium business.

In the production of molded plastic items, the greater the volume the greater the economy. Thus, they are ideally suited for premiums which depend for their success on quantity production and distribution. In addition, the light weight of plastics reduces mailing costs. The fact that the plastic items generally do not break easily reduces losses in handling, and makes it possible to use lighter, simpler packaging—thereby further reducing costs of handling and mailing.

Syrup pitcher reproduces trade mark and has tie-in with product

COURTESY MONSANTO CHEMICAL CO.

Cereal premium, "Mr. Quaker," is either cream pitcher or milk mug

the Millions

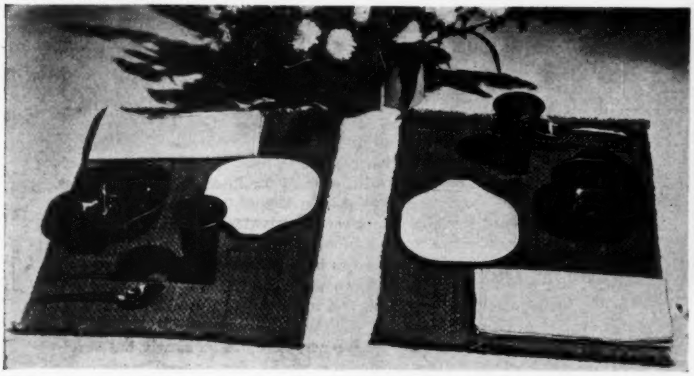
West Warren, Mass. The set, offered for 50¢ and a box top, consists of two square plates, two square bowls, and two matching tumblers. The offer was made late in 1949, and 250,000 sets have been sold.

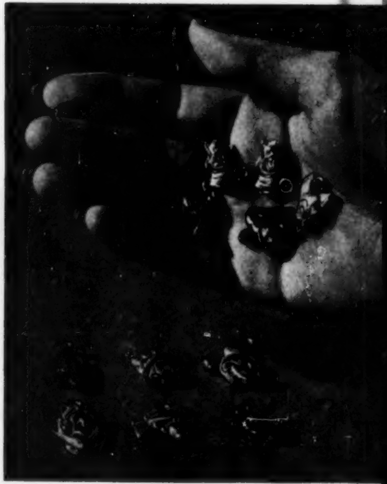
Charms for Vending Machines

Vending machines which dispense candy in bulk have long used charms and other small premiums to attract sales. Recently, Alladin Plastics, Inc., Los Angeles, Calif., began to mold cellulose acetate charms and to sell them by the pound for use in such machines. The charms are molded to resemble Walt Disney characters or characters from comic strips. Despite the royalties involved and the expense of plating the charms after molding, the plastic charms proved to be less expensive than the metal ones previously used—and their use instead of metal boosted sales almost 500%!

Six-piece breakfast set distributed as a cereal premium has close product tie-in, is self-liquidating at 50¢; it is molded of heat-resistant polystyrene

COURTESY MONSANTO CHEMICAL CO.





Charms for bulk candy vending machines are metal-plated acetate

Molding for Realism

PLASTICS BUILD BETTER PRODUCTS AND BETTER VALUES

TOYS AND SPORTS GOODS

COURTESY THE LIONEL CORP.

Freight and passenger cars have upper structures molded of plastic. Transparent material is used and parts are sprayed with dull finish after molding

UP UNTIL 1937, The Lionel Corp., New York, N. Y., was using practically no plastics. Now Lionel, the world's largest manufacturer of model electric trains, uses 650,000 lb. of plastics a year.

Lionel has facilities in its own plants for making virtually any needed part of virtually any material. It has equipment for stamping parts from sheet metal, for die casting, machining, injection molding, compression molding, mold making, and for the manufacture of parts by methods of powder metallurgy. Thus, says Lionel's Chief Engineer, Joseph Bonanno: "We have no axe to grind. We are not prejudiced in favor of one material or one process. We just try to use each material where it is best suited."

This impartiality makes it particularly significant that Lionel finds plastics "best suited" for enough applications to consume 400,000 lb. of thermosetting materials and 250,000 lb. of thermoplastics each year. The company is currently using phenolics of all types, polystyrene, cellulose acetate, cellulose propionate, cellulose acetate butyrate, nylon, acrylic, and vinyl.

These materials go into so many varied applications in Lionel trains

According to the Toy Guidance Council, Inc., all toy sales records were broken in the past year with over $500 million in retail business. It is conservatively estimated that at least 40% of the toys now produced are made of plastics, while others contain plastics components.

The advantages to the toy manufacturer in use of plastics are many and obvious. The economy of plastics in comparison with metal, rubber, wood, and other materials, has been proved over and over again. But in the ingenuity of toy designers and molders lies the chief reason for the success of plastics in toys.

The related sporting goods field has accepted plastics slowly but surely to the point where fishing tackle, gun stocks, decoys, and many other products are big outlets for components made of high impact plastics.

Throughout the economics of both fields runs a basic theme: hand labor costs are reduced by proper design and modern molding.

and Economy

Lionel model trains use the plastics best suited to the purpose—and use 650,000 pounds of them a year

and accessories that it would be impossible to cover all of them in the limited space available for this article. It is possible, however, to trace the history of Lionel's growing use of plastics and look at some of the applications which convinced the company that these materials could be used to make the best products and the best values.

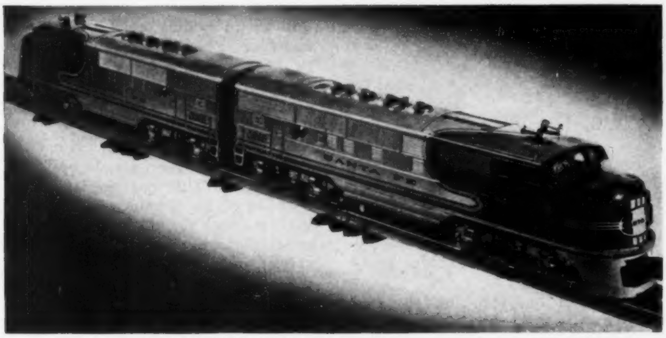
For all practical purposes, Lionel's real interest in plastics began in 1937 with the first piece which the company molded itself. Up until that time, the only plastic parts in Lionel train sets were some small phenolic electrical parts, push-buttons, crossing blocks, and a few acrylic headlight lenses.

In 1937, Lionel was tooling up to produce the most accurate, most detailed scale model it had ever attempted — a scale model of a New York Central Hudson Division locomotive. The "coal pile" in the tender on previous Lionel models was stamped from sheet metal, but the metal part did not measure up to the rigid realism requirements for the Model 700E.

Chief Engineer Bonanno therefore rigged up an old hydraulic press, designed a beryllium copper mold, and produced a one-piece phenolic coal pile. This piece was realistic enough in appearance to be adopted for the Hudson locomotive. Lionel's satisfaction with the application is proved by the fact that phenolic coal piles have been standard on Lionel tenders ever since.

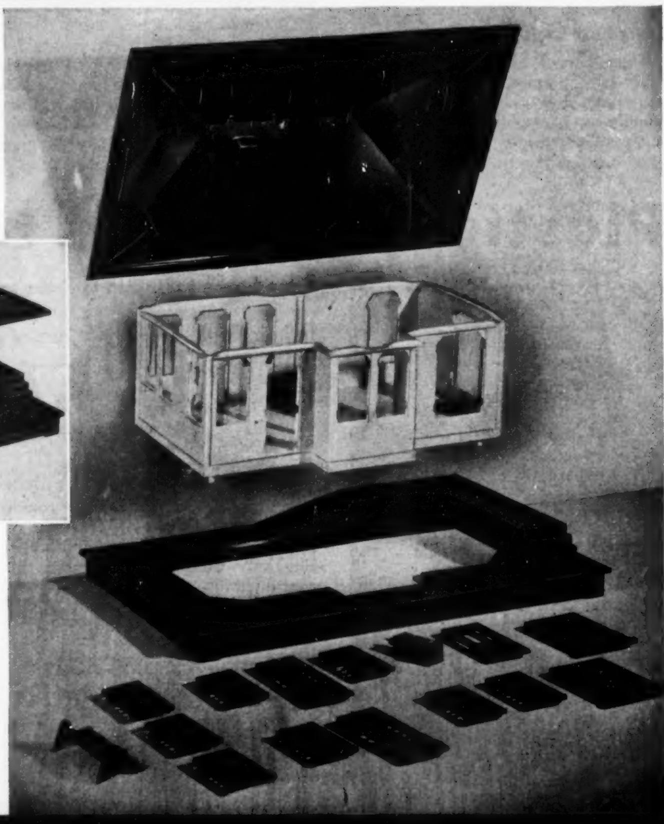
Penolic for Savings

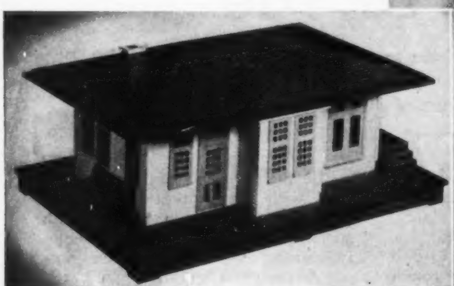
It is significant that Lionel's first molded piece owed its existence to a desire for realism. It is doubly significant that the application which



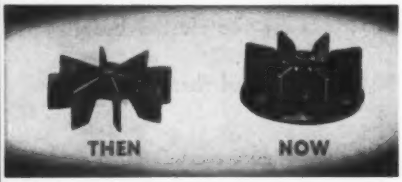
PHOTOS COURTESY THE LIONEL CORP.

Realistic model of two-unit G.M. Diesel locomotive has cellulose propionate upper structure. Before 1949, Lionel used metal for housings of all its locomotives





Station for train set has roof and base molded of polystyrene. Windows, doors, and walls are molded of styrene copolymer. Windows and doors are backed with transparent acetate. Details, even nail heads in platform planks, are molded-in



Phenolic whistle impeller replaced zinc die casting at saving of 80%

Chief Engineer Bonanno considers the second important milestone was one in which a phenolic part replaced a metal part in order to cut production costs. Realism and/or economy in production have been the main reasons for the use of plastics in the varied and numerous applications which Lionel has adopted since.

The second application of importance was an impeller for a locomotive whistle. Up until 1938, this part was made of die-cast metal. In that year, Lionel installed a Stokes fully-automatic compression-molding press (one of the first such presses ever produced) and began to mold the whistle impellers of phenolic. The molded phenolic impellers cost 80% less to produce than the die-cast parts — and Lionel is still using the phenolic impellers in current models.

Molded Car Bodies

Once Lionel had set up its own molding equipment, it was probably inevitable that it should consider the possibility of molding upper structures of cars. The first experiment in this direction was a coal tender which Lionel produced just before the war. The body of the car and the coal pile were molded in one integral piece of cellulose acetate butyrate. The molded part was sprayed with a dull matte finish.

The coal tender with the butyrate upper structure weighed only ¼ lb., whereas the zinc-base die-cast car it replaced weighed 1¼ pound. The decrease in weight greatly reduced the load which the tender placed upon the locomotive. More important, the butyrate tender cost 60% less to produce than the older zinc-bodied model.

> **"A manufacturer who is not using plastics in every place where they could be used is like the man who hasn't yet bought a refrigerator for his home because he is 'waiting for them to be perfected.' He is missing a sure bet!"—*Joseph Bonanno, Chief Engineer, The Lionel Corp.***

After the butyrate tenders had been in the field for a few years, Lionel had unmistakable proof that their performance and their durability in service compared favorably with that of the tenders with metal bodies. This experience encouraged Lionel to mold bodies for other types of cars as soon as the war ended. By 1949, a large majority of the Lionel cars were being produced with molded plastic superstructures. Metal is still used for the bottom frame and wheel trucks, thus keeping the center of gravity of the cars low so that they can hold the rails.

Lionel's main reason for preferring plastic superstructures is the possibility of molding-in accurate details like window frames, steps, ventilators, hand-grips, and even rivet heads. A second important advantage is the performance of the plastic-bodied cars. They are so much lighter than metal-bodied cars that they make it possible for an engine to pull far longer trains.

In addition to these advantages, the plastic upper structures are more economical to produce. An exact cost comparison between plastic and metal bodies cannot be made, however, because cars as realistic in appearance as the plastic ones could not be economically produced of any other material.

Transparent Polystyrene Used

For most of the cars, Lionel uses polystyrene. This material is favored because of its dimensional stability. Wall sections far thicker than those usually employed in molding polystyrene are used. This assures that the molded pieces will have adequate impact strength.

The wide color range and the high surface luster of polystyrene, which are usually numbered among the advantages of the material, are not advantages in Lionel's case. In order to closely simulate the appearance of real railroad cars, most of which are made of metal with a rather dull

(Continued on page 257)

Plastics from Head to Toe

From heads to bodies to limbs to eyes to hair has been the progress of plastics in doll production

COURTESY IDEAL NOVELTY & TOY CO.

Snoozie infant doll has head and limbs molded of vinyl paste resin

FOR MANY years, the heads and limbs of dolls were made of a composition of wood flour, starch, rosin, and water. The material was a constant source of trouble to doll manufacturers. It provided a rough surface, was extremely fragile, and required a great deal of hand labor. The only thing to recommend the continued use of this material was the fact that it was cheap.

The molded parts had to be covered with a glue coat in order to permit sanding down to a smooth surface. This glue coat was extremely hygroscopic and caused the covering lacquer on the dolls to crack and craze. Furthermore, the hygroscopic nature of the glue limited doll production to non-humid periods. Manufacturing operations had to be suspended throughout the summer and for three or four weeks during the fall.

A. M. Katz, production chief of Ideal Novelty & Toy Co., New York,

	MAGIC SKIN DOLL (1940)	TODDLER (1945)	SPARKLE PLENTY (1947)	TONI (1948)
HEAD	CELLULOSE ACETATE BUTYRATE	CELLULOSE ACETATE BUTYRATE	CELLULOSE ACETATE BUTYRATE	CELLULOSE ACETATE BUTYRATE
HAIR	MOLDED AS PART OF THE HEAD	MOLDED AS PART OF THE HEAD	RAYON	NYLON
EYES	METAL COVERED WITH CELLULOSE NITRATE	METAL COVERED WITH BUTYRATE	ACRYLIC	ACRYLIC
BODY	LATEX RUBBER	BUTYRATE	LATEX RUBBER	BUTYRATE
LIMBS	LATEX RUBBER	BUTYRATE	LATEX RUBBER	BUTYRATE

PHOTOS COURTESY IDEAL NOVELTY & TOY CO.

N. Y., was particularly interested in these problems. In 1935, when Dr. Joseph S. Michtom gave up his dental practice to enter the company, Mr. Katz asked him to see what he could do about developing a better material than the old composition.

In 1936, with the aid of Harry Simpson of Tennessee Eastman Corp., and Hydraulic Press Machinery Co., Dr. Michtom converted an old aluminum mold used for an obsolete rubber head to an experimental mold for use in an injection molding press. A few thermoplastic heads were molded and Ideal was convinced that it was on the right track. But the cost of production was about four times the cost of producing the same head of the composition material.

Butyrate Head

It was not until 1940, when Mr. Katz developed Ideal's famous Magic Skin doll, that the company actually went into production on an injection-molded head. The material chosen was Tenite II cellulose acetate butyrate.

Although the cost of producing the butyrate head was not as high as Ideal had estimated in 1936, is was still much more than the cost of producing a similar composition head. However, the butyrate head was unbreakable, it could be produced 365 days a year regardless of weather, and there were no returns due to crazing of lacquer. Despite the higher production cost, the consumer was getting a better, longer lasting doll—and therefore a better value.

Production of the Magic Skin doll was discontinued because of the war in December 1941. When Ideal resumed doll production in 1945, it introduced the Toddler doll. This

(Continued on page 257)

25 Times the Life

Acetate playing cards cost five times as much as paper, but their use cost is only 1/5 as much

IN 1948, 56 million tax stamps were purchased for playing card decks. The actual number of decks of plastic cards produced must inevitably remain a statistical mystery since few companies are involved in the business; it has been estimated to be anywhere from 5 to 10% of the total.

Plastics have been used for playing cards since the turn of the century when cellulose nitrate was introduced to this market. Today the greatest proportion of plastic cards are made of cellulose acetate, these cards having been introduced in 1934 when the company now known as Kem Plastic Playing Cards, Inc., New York, N. Y., went into the field.

As Ely Culbertson found 15 years ago, the plastic cards can be absolutely guaranteed to show no deterioration after 600 rubbers or a year of heavy use. A $7.50 pair of bridge decks will outlast by more than 25 times a pair of paper decks costing $1.50. Thus the use cost of

COURTESY CELANESE CORP. OF AMERICA

plastic cards is actually only 1/5 of that of paper cards.

The war offered an international market for Kem cards which passed the roughest of field tests. In Pacific concentration camps such cards have been used 16 hr. a day for months on end and are now museum pieces because of their extreme durability.

Kem specializes in cellulose acetate cards; other companies are still producing nitrate cards; still others are offering cards coated with vinyl and other plastics materials.

Cards at left, made of Lumarith by Kem, were used throughout Pacific campaign, exposed to sun and rain, dropped in sand and mud. Faces, backs are worn, cards unbroken

Dollar for Dollar, a Better Stock

Butyrate gun stocks offer more style and greater serviceability for price than obtainable in wood

Slide-action .22-caliber rifle has cellulose acetate butyrate stock molded in one piece. The slide handle is also molded of butyrate

PHOTOS COURTESY TENNESSEE EASTMAN CORP.

LIKE many other rifle and shotgun manufacturers, Noble Mfg. Co., Inc., Haydenville, Mass., has adopted plastic stocks in place of wood. The Noble Model 33 slide-action .22-caliber repeating rifle has a stock and slide handle molded of Tenite II cellulose acetate butyrate by Presque Isle Plastics, Inc., Erie, Pa.

How does the cost of producing butyrate stocks compare with the cost of walnut stocks? Mr. Frank T. Green, vice president of Noble Mfg. Co., Inc., gives the following answer:

"The cost of producing Tenite stocks is, of course, largely determined by the weight of the material which goes into them and is independent of the detail of design which may be in the finished piece. Wooden stocks, on the other hand, vary in cost from a point less than the cost of the plastic to a high many times the cost of the molded stock, depending on the amount of hand labor involved.

"There has been a considerable amount of refinement in the methods of producing wooden gun stocks over the past five to seven years, principally by the introduction of automatic carving machines and improved sanding and finishing equipment. These changes have brought about some economies in the amount of man-hours involved, but the savings realized here have been more than offset by the in-

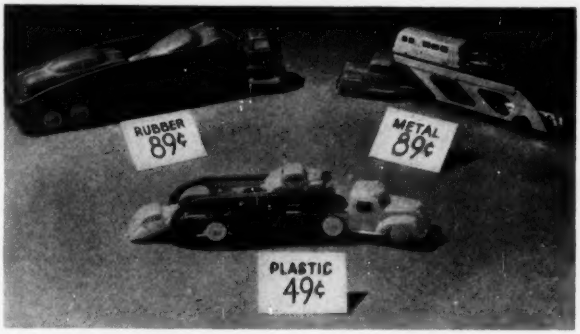
creased cost of labor. The net result is that wooden stocks have continued to cost more money.

"It is possible to produce a plain wooden gun stock for a given weapon at approximately the same cost as a Tenite gun stock. However, it is important to bear in mind that such a wooden gun stock will not have many of the features which are desired by the gun buyer.

Design Features

"The plastic stock, dollar for dollar, offers more style, greater serviceability, and additional design features," continues Mr. Green. "The wooden stock at the same price level will not permit such items as fluted combs, full pistol grip with cap, checkering, fluted finger grooves on the fore end, side paneling, or other decorative devices. To add these to the basic wooden stock may vary the factory cost level from \$1.50 to \$3.00 per stock, depending upon the

(*Continued on page* 257)



The economics of plastics molding are neatly illustrated by these three toys, which were displayed side by side in the window of a toy shop in New York. The plastic version of the toy, in addition to its price advantage, is the only one of the three with a hinged tail gate which acts as a ramp. It is molded of polystyrene by Allied Molding Corp., Corona, N. Y.

Five Parts Do the Job of 67

Simplified design of harmonicas speeds assembly, cuts costs. America now exports to the world

PERHAPS the outstanding example of simplification of design through the use of plastics is the harmonica with a molded polystyrene reed section. A simple 10-hole wood and metal harmonica has 67 parts; more than 150 operations are necessary to assemble each instrument. The all-polystyrene 10-hole harmonica has only five parts; it is assembled in one operation!

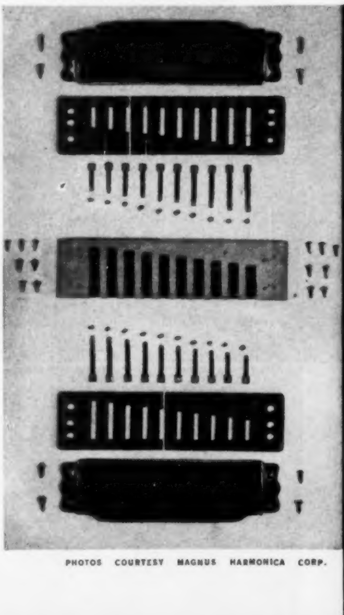
The all-plastic harmonica was introduced in 1945 by Magnus Harmonica Corp., Newark, N. J. Before that time, virtually all harmonicas sold in this country were made in Germany, Czechoslovakia, or Japan, because only cheap foreign labor could be used economically to produce harmonicas. Even in the simplest harmonicas, the reed section alone had 42 parts, including 20 individually machine-ground and hand-tuned brass reeds.

Finn H. Magnus eliminated all these operations by designing a polystyrene reed section which could be molded in one piece, with each reed as an integral part of the reed plate. This made possible a 10-hole harmonica consisting only of a top cover, a bottom cover, a blow reed-plate, a draw reed-plate, and a center-comb section. The five parts are assembled in one operation.

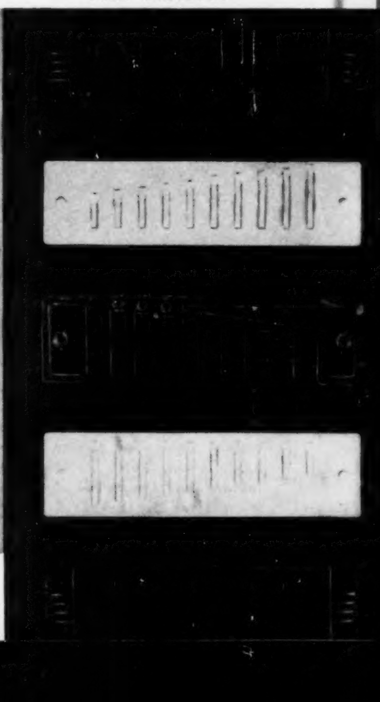
The Magnus 10-hole harmonica retails for 79 cents; the comparable

Foreign-made 10-hole harmonica has 67 parts, requires 150 assembly operations. Polystyrene harmonica has only five parts, assembly is done in one operation

METAL AND WOOD



ALL PLASTIC



PHOTOS COURTESY MAGNUS HARMONICA CORP.

imported instrument retails for around $2.50. As a result, the polystyrene harmonica is outselling the foreign ones which once dominated the market in this country, and America now exports harmonicas.

The molded polystyrene reed section has also been applied to the production of other types of harmonicas, and to piano accordions, with similar results. For example, Magnus is able to manufacture a chromatic harmonica which retails for $3.95 as against $10 for a comparable wood and metal instrument. Magnus also makes a chromatic accordion with 40 sharps and flats on the treble set of reeds and 16 bass chords. It retails for $9.95 as compared with $35 or more for any other comparable accordion ever made.

Nothing but Plastic Would Do

Toy blocks build on the transparency of polystyrene to produce effects not obtainable safely with any other material

THE TRANSPARENCY of polystyrene has been used to advantage by Kusan, Inc., Henderson, Ky., to produce an entirely new type of children's toy blocks. The new blocks could not have been produced of anything but plastics because safety considerations rule out glass in toys for young children.

Kusan's first big innovation was the Koo Zoo blocks. Each block consists of a transparent polystyrene cube with an opaque base. A molded figure of an animal is cemented to the base to give the block the appearance of a transparent cage with an animal in it. Thus a three-dimensional "decoration" is obtained without actually decorating the surfaces of the block.

The Koo Zoo blocks were introduced early in 1948 along with the KABC blocks, which consist of transparent cubes decorated by sealing printed paper decorations inside each block. Kusan's blocks won an award in the Seventh MODERN PLASTICS Competition.

In 1949, Kusan brought out an improved version of its blocks which carried the same principle one step further. The Kusan Karnival blocks have *movable* plastic figures inside them. Each block contains a figure which can be made to perform by shaking or tilting the block. The set of eight blocks consists of: 1) a merry-go-round; 2) a ferris wheel; 3) two figures on a see-saw; 4) a dog which jumps; 5) a bicycle rider; 6) a dancing animal; 7) two seals which juggle a ball; and 8) two men who juggle hoops.

The various figures are assembled from 37 tiny molded polystyrene parts. These internal parts are turned out economically in two dies, one with 20 cavities and one with 28. It is impossible to compare the cost of producing the blocks of polystyrene with their cost in any other material because the combination of moldability, durability, and transparency is available only in plastics. Without plastics, the blocks could not exist.

Transparent polystyrene blocks at right are decorated by putting molded figures or printed paper inside them. Later development (above) has figures which move when block is shaken or tilted

PLASTICS BUILD BETTER PRODUCTS AND BETTER VALUES

BUILDING

Specially designed rack displays, dispenses, measures, and cuts saran screening

PHOTOS COURTESY LUMITE DIV., CHICOPEE MFG. CORP.

Windows in new Bell Telephone Laboratory at Murray Hill, N. J., have saran screens

Saran Screening Now a Staple Product

Lower in cost than some metal screenings, higher than others, plastic screening has unique anti-corrosion properties

THE PLACE of saran window screening in the building and home maintenance picture has become firmly established in the past three years. First developed for wartime use when metals were short, and proved in the field under extremes of temperature, attack by mildew, rot, and vermin, these screens first hit the domestic market late in 1945.

Latest Bureau of Census figures available are for 1947 when 593,271,000 sq. ft. of metal screening were sold. Of this, steel (black and galvanized) took 336,188,000 sq. ft., copper and bronze 195,180,000 sq. ft., aluminum and other non-ferrous metals 61,903,000. In that year it is estimated that saran screen amounted to 20% of the metal total or around 118 million square feet.

Present costs of screening are: aluminum, 14¢ per sq. ft.; bronze 15¢; plastics 11½ to 12¢; galvanized steel 7 cents. It is obvious that the market for saran screen comes partially from all sectors of the metal screen market. However, the particular ability of the plastic to stand up to salt air and chemical attack is giving it some preference in coastal areas and industrial centers.

Since the immediate post-war market for window screening has been taken care of, it is doubtful whether the total annual market will remain anything like the 700 million sq. ft. volume that it attained in 1947; it is more likely to be below the 600 million sq. ft. mark. But another likelihood is that the position of saran screening in this market will remain strong.

PHOTOS COURTESY IMPERIAL CHEMICAL INDUSTRIES, LTD.

Acrylic panels are arranged in checkerboard pattern in roof of corrugated building to insure even distribution of light

Acrylic sheets formed to match corrugated metal and asbestos sheets can be substituted for such sheets in existing roofs

Acrylic Roofs in Britain

Corrugated sheets, matching metal and asbestos roofing, admit more light than glass, are easier to install

DURING the war years in Great Britain, industrial factories had been built without roof lights in order to conform with black-out regulations. Post war, Imperial Chemical Industries, Ltd., Herts, England, started to promote corrugated acrylic sheets as a convenient and economical means of day-lighting such war-time plants.

The acrylic sheets, which were formed to match most standard corrugated iron and asbestos cement roofing sheets, were designed so that they could be quickly substituted for existing roofing sheets.

Advantages claimed for the transparent acrylic sheets are simple installation, light weight, and 15% greater light transmission than ¼-in. wired glass.

The basic cost of an acrylic sheet is considerably greater than that of glass. However, installing glass sheets usually requires skilled labor and, in general, is quite costly. Also, the glass sheets must be installed in "runs," thus concentrating light in one part of the floor area of the building. A higher overall spread of light can be achieved by using a smaller total area of corrugated acrylic and distributing the sheets in star or checkerboard manner.

Today, after being on the industrial market for over four years, the transparent roofing has proved itself and is now one of the largest applications of acrylic sheets in Great Britain. An approximate 1200 tons of corrugated acrylic are being sold a year for the British home market.

Resorcin Replaces Nails

Plywood forms for concrete are stronger when held together with plastic adhesive; are lower in cost and easily handled

EVEN a small percentage of saving on a colossal building project is bound to be reflected in substantial economies—and resorcin glue is doing just that at water-power dam construction sites in Canada.

The Hydro-Electric Power Commission of Ontario has a group of hydraulic power developments under construction which will produce upwards of 1,000,000 hp. when completed. Just one of these developments, the immense Des Joachims project, requires 860,000 cu. yd. of concrete—enough to build a 4-in. thick, 4-ft. wide sidewalk from coast to coast.

Penacolite G-1131, a resorcin adhesive with the ability to set at a wide range of temperatures, is a product of Koppers Co., Inc., Pittsburgh, Pa. Distributed in Canada by the Plastics Div. of Canadian Industries, Ltd., Montreal, it is playing an important part in lowering costs and speeding construction on the Des Joachims development and two others now being built. The glue is used in the fabrication of 4 by 10-ft. plywood panels to hold fresh concrete in place during pouring and until it has set.

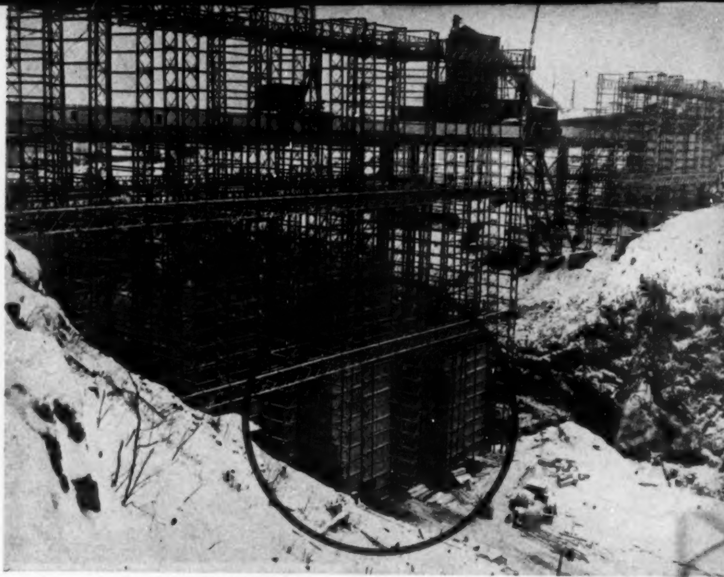
Methods Compared

The standard method of making such forms is for carpenters to build the wooden framework out of 1-in. boards nailed to 2- by 4-in. or 2- by 6-in. studs on the job, or to make panels by nailing boards to studs and moving them to the job.

The panels being used on the Des

Joachims project are made of 4-ft. by 10-ft. by ¾-in. plywood with 2- by 4-in. ribs or studs fastened to them with the resorcin adhesive. The supporting framework is steel, being composed of Bailey Bridge parts.

The new panels have the advantages of being light in weight, sturdy, easily placed, and easily stripped from the hardened concrete. A T-beam action is developed between the plywood sheets and studs, something not possible economically with nails and screws; by the use of the glue, a panel with 2- by 4-in. studs is stronger than a nailed panel with 2- by 6-in. studs. While nails have a strength of "one" in this application, the glue has a relative strength of "nine." But the glue has to be waterproof, which eliminates casein and other animal and vegetable adhesives; it has to have chemical inertness and resistance to deterioration; it has to be unaffected by molds, fungi, acids, solvents, and alkali solutions; it has to stand up under extremes of heat and cold as well as does the wood itself.



COURTESY CANADIAN INDUSTRIES, LTD. AND HYDRO-ELECTRIC POWER COMMISSION OF ONTARIO

Resorcin adhesive is applied to the fabrication of plywood panels used as forms for concrete in construction of dam. Plywood forms are visible in circle

How Glue is Used

The glue is applied by brush and the studs held in place for cure by nailing. After the application of glue, the finished panels are stacked for at least 8 hr. to allow the glue to set; then they are painted. A total of 110 3-in. nails and 1 lb. of glue is used in assembling each panel.

The cost of panel manufacture for labor and materials is less than 50¢ per sq. ft., and with the number of re-uses possible on any large project, the material cost per use is small.

Plywood concrete forms are far from new, but the Consulting Engineer Div. of the Hydro-Electric Power Commission of Ontario, under the direction of E. P. Muntz, is the first to make large-scale use of the economies possible with an adhesive applied to concrete form construction.

Vinyl Strip Trims and Seals

Extrusion replaces caulking compounds and metal strip for sealing cracks and joints around bathroom fixtures

AN EASY-to-apply sealing strip, called Tub-Kove and made from Geon, is being produced by Keller Products, Inc., Cleveland, Ohio. The strip is designed to seal and cover cracks at junctions of wall and bathtub, washbowl, stall showers, etc., thus preventing steam or water from entering and causing damage to plaster walls and woodwork.

The use of caulking compounds and metal chrome bead strip are other methods of sealing cracks in bathroom walls. The former, usually supplied in tube form and applied with a gun, will generally harden, craze, and crack. Metal chrome bead strip, which is primarily a trim material providing no watertight seal, requires skilled labor to install and is priced at approximately 25 to 30¢ a foot — higher in cost than Tub-Kove, which retails at about $2.80 for 15 ft. of stripping and the adhesive.

The new sealing strip is white in color, highly flexible, will not craze or crack, and is unaffected by water. It will not harden and is resistant to normal alkali solutions, acids, and alcohols. Common household cleaning solutions, soaps, and detergents generally used will not affect the strip. The vinyl adhesive supplied readily adheres to porcelain, wood, clay tile, plastic tile, vinyl, and linoleum wall coverings. The trim strip can be painted if desired.

COURTESY B. F. GOODRICH CHEMICAL CO.

Vinyl strip is used to seal joint between top of bathtub and wall

PLASTICS BUILD BETTER PRODUCTS AND BETTER VALUES

PACKAGING

Carton Shipping Costs Cut

Vinyl-coated paper makes better carton for dairy products. Parts are shipped flat, set up at plant

THE newest entry in the battle between glass and paper for dominance in the highly competitive dairy field is a vinyl-coated paper milk container that offers economies in both transportation and storage. This development opens up a tremendous new outlet for plastics, inasmuch as use of paper cartons in the dairy market has grown from half a billion units in 1939 to an estimated 4½ billion in 1949.

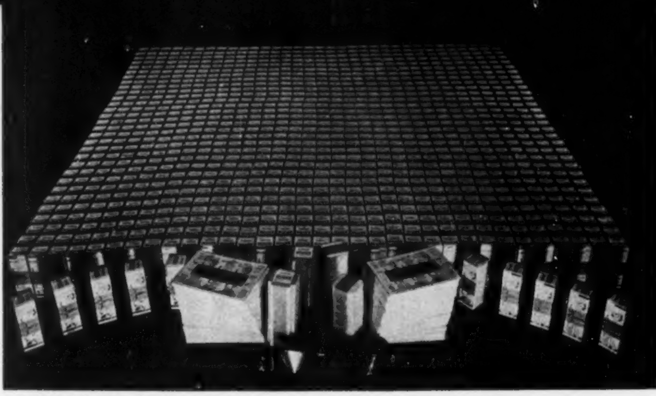
The new milk container, which was developed and is being manufactured by the Sealright Co., Inc., Fulton, N. Y., has been in use for more than a year at the River Forest Plant of the Bowman Dairy Co., Chicago, Ill., and for six months at Borden's Chicago plant. The container is the first of its kind to be set up at the dairy from completely flat blanks and the first of its kind to make use of vinyl resins for a coating instead of the customary paraffin or wax.

The dairy receives the vinyl-coated containers from Sealright in three separate pieces — sidewalls, bottoms, and tops. The sidewall blanks are coated on both sides with the same vinyl composition. The end blanks, however, have vinyl on one surface and a special thermosetting plastic on the other, so that when the tops and bottoms are folded over, compressed at the corners, and heat-sealed to the body, they will adhere firmly on their inner surfaces but will not stick to the heat-sealing plates.

Carton Automatically Assembled

In the dairy plant, the container's components are loaded into a specially designed carton-forming and filling unit, which sterilizes the pieces by passing them through gas flames within hooded chambers. The three parts are then assembled by automatically applying the tops and bottoms under heat and a pressure greater than 2500 p. s. i., thus producing a lightweight, sturdy, essentially leakproof carton.

After the body of the container is formed and the bottom heat sealed on, the carton unit applies a small strip of aluminum foil over the top of the body wall. This foil strip, which is printed with the day of the week as a tamperproof dating feature, is also coated with vinyl for heat-sealing purposes. After the



COURTESY SEALRIGHT CO., INC.

Opposite page: Vinyl-coated paper milk containers come in quart, pint, third-quart, and half-pint sizes: Above: Space saving is demonstrated by display of 1000 vinyl-coated cartons with materials required to make them in foreground

The five billion-dollar-a-year packaging industry has come to be one of the largest users of plastics. The wide variety of chemically inert resins and the huge choice of available forms of plastics containers have made it possible to package in plastics everything from milk to motors, from vegetables to razor blades, from pencils to penicillin.

Films in all gages from $\frac{1}{8}$ mil to 10 mils, molded boxes by the millions, transparent rigid sheets (these to the extent of 10 million lb. a year), closures of every conceivable type, squeezable bottles (over 30 million have already been produced), valves for pressure-pack products, applicators of many kinds—these show the range of plastics in packaging. Beyond these direct uses come plastics in coatings and adhesives.

carton is filled, the top is sealed over the foil. The sterilizing, forming, filling, and heat-sealing action is accomplished within a single machine.

Vinyl Will Not Crack

The plastic coating, which is a special formulation of Vinylite resins, is odorless, tasteless, colorless, and completely inert to all products that come in contact with it. The vinyl coating is much thinner than wax or paraffin and is uniformly distributed and well bonded to both sides of the carton blanks. It will not crack or flake off in service, and thus offers a smooth inner-carton surface to which milk and other dairy products will not adhere.

Although the new container, which is marketed under the trade-name of Sealking, has many utility features, the manufacturer emphasizes the point that reduced shipping costs and storage requirements are among its greatest virtues from the operating standpoint. It is reported that an average-sized dairy using 1,000,000 containers a month can be supplied for three months by two carloads of the new type container. The same supply of a partially set-up paper container would require six cars; the completely set-up type would take 40 cars to carry the same supply. This involves a saving of more than 90% in shipping space. Another important factor is the container's resistance to weight pressure, which is claimed to be twice that of any other rectangular paper milk container. This increased strength of the vinyl-coated container makes possible the safe stacking of filled cartons.

Coatings of vinyl are not new to the food industry. They have been successfully used before in applications that call for its being in direct contact with food products. The Sealking package, however, marks the initial use of vinyl coatings on paper milk cartons and it has received a clean bill from Chicago and New York boards of health.

Available in half-pint, third-quart, one-pint, and one-quart sizes, the new container is suitable for all fluid dairy products, as well as fruit juices and other foods of a liquid nature.

Although definite figures have not been made available, Bowman officials report that carton spoilage and product waste on the vinyl-coated container have been almost nil. The impervious vinyl coating combined with the heat- and pressure-sealed construction of the container's corners hold leakage to a very low figure. As far as costs are concerned, the manufacturer states that its quart-size package is no more expensive than the standard wax-coated paper milk container; in smaller sizes, it is reported to be considerably less expensive.

Consumer acceptance of the vinyl-coated carton has been extremely high. In a market research survey, hundreds of people who purchased the plastic-coated carton indicated overwhelming approval.

Molded Box for Problem Product

Medicinal material stained paper packages and returns were high.

Plastic box does not stain, keeps product sold

THE problem faced by The G. F. Harvey Co., Saratoga Springs, N. Y., in packaging its "Ozettes" suppositories, was a costly one. The product has a low melting point, and is quite fragile in its molded form. The previously used set-up paper box, being stored under varied conditions, became oil stained and unsalable. The return of packaged boxes made the item unprofitable.

The answer to the problem was a polystyrene molded package, the form of which duplicated that of the product itself. Polystyrene was selected for the purpose because it promotes no chemical reaction, is low in cost, and is available in a variety of colors. The company was thus permitted to retain "its family of packages" and match the colors used on its labels and cartons.

The molding was done by Sara-

Molded package of polystyrene for suppositories is designed to match shape of the product, permits easier handling than paper box (upper right). Plastic container, available in various colors, does not react chemically to contents

toga Plastics, Inc., Saratoga Springs, N. Y. The cost of the new plastic container is at present only ¾ of a cent higher than the cost of the former paper box which had a removable paper cover and waxed paper dividers. Even lower costs on the plastics boxes are anticipated as larger quantities are used as a container for other suppositories in the company's line. Labor costs for putting the product in the package are about the same as on the old package, but again, these are expected to be lowered as package line employees become more familiar with the molded box.

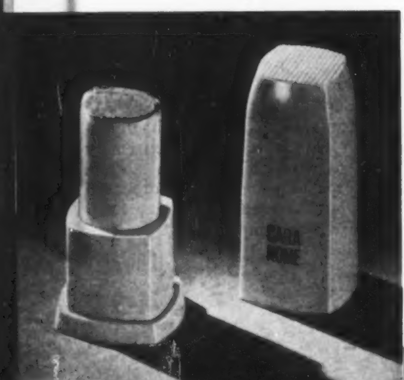
The two-piece plastic box, which contains an interior handling strip of cellophane, has received particular acceptance approval by a number of doctors.

Other advantages of the new package are far greater sales appeal and perfect product protection. Even without these advantages, the new box at its slightly higher price would effect a material saving by the virtual elimination of damaged returned goods.

Why Rexall Turned to Plastics

Costs had to be reduced. Plastics packages were introduced.

Costs dropped, sales soared, profits rose



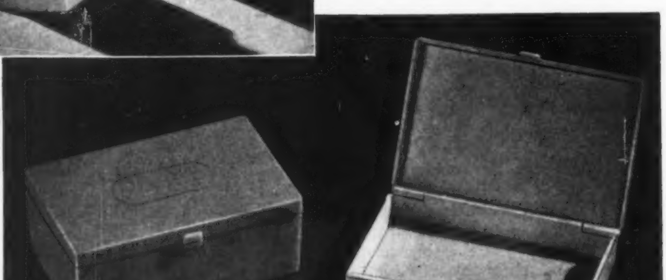
Cellulose acetate make-up stick package is building big sales

THE REASON why Rexall Drug Co., Los Angeles, Calif., went into extensive plastics packaging was, according to J. A. Walls, manager of Packaging Research, Merchandising Div., a matter of economy. Rexall's definition of package "economy" involves: a) low package price; b) trouble-free passage through filling and shipping lines; c) high speed of sale in the retail store; and d) frequency of repeat sales.

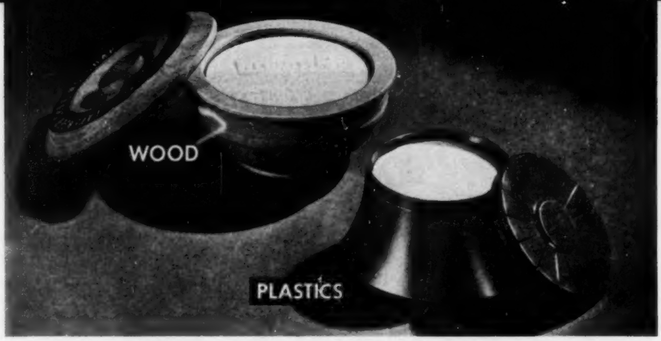
Last year Rexall's sales researchers found that total costs of its own goods—raw materials, packaging, and labor—had increased 45% since 1942, while sales prices had increased only 15%. Prices could not be raised; quality reduction was unthinkable. Low cost packages that would handle better and sell faster were one of the obvious answers to the profit squeeze. Plastics packaging possibilities were studied.

Shaving Bowls

The lavender shaving bowl was one of the first items to be given the "plastics cure." A Styron bowl, molded by The Bolta Co., Lawrence, Mass, replaced a wooden bowl. Yet the plastic package costs 8½¢ less, has provided improved design and

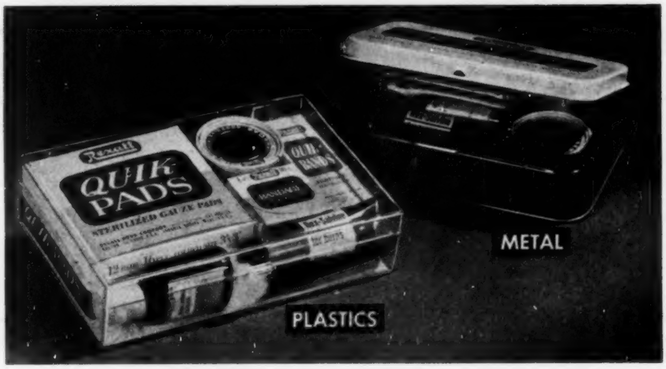


Durability and eye-appeal are major assets of new prescription box



Distinctive product recognition is inherent in polystyrene shaving bowl which costs 8½¢ less than wooden unit. Plastic bowl sales show substantial increase

Added visibility gives styrene first-aid kit good display value. Consumer reception has been high for plastic unit which costs no more than metal container



better product identity, and has contributed to substantially increased sales.

First-Aid Kits

The excellent display possibilities of the individual Rexall first-aid items laid out in a metal kit suggested the creation of a package in clear plastic. The box was developed at a cost of no more than that of a similar box made of metal. Consumer acceptance of the item has been excellent and Rexall druggists throughout the country report unusually good sales. The box is manufactured by The Plas-Tex Corp., Los Angeles, Calif., from Lustrex styrene.

Prescription Boxes

For some time druggists had been requesting better boxes for the more expensive prescription tablets and capsules. As a store expense item, any new box would have to be no more costly than the traditional shoulder-style paper set-up box. If a durable, beautiful plastic box could be had at the same price, Rexall druggists would have a merchandising advantage.

It was done in Lustrex styrene by The Plas-Tex Corp. at about the same cost as a good quality set-up paper box. Consumers are delighted with more attractive, more durable, re-usable prescription boxes; druggists welcome them.

Make-Up Stick

Now the company has introduced its Cara Nome make-up stick to overcome use disadvantages of the old style flat packages. The convenience of the new package as well as its beauty are building big sales. Made from Hercules cellulose acetate by The Bolta Co., the stick, by sheer ingenuity on the part of designers and molder, was made at one-third the cost of original quotations on the job, proving that plastics packaging need not be expensive if know-how is applied.

With Rexall, plastics packaging is a policy—based on economy!

The Revolution in Blade Packs

With an $80 million market to shoot at, razor blade manufacturers needed better packages. Plastics provided them

BEFORE the war, one of the country's leading razor blade manufacturers began research on a molded plastic blade dispenser that would make it possible for the consumer to load his razor directly from the pack without touching the blade.

The major problem was to develop a dispenser that could be economically mass-produced. A secondary problem was to find a material that would be available in sufficient quantity for production of millions of dispensers, that would be light yet durable enough to withstand plenty of handling, and that would be inexpensive. The solution was found in polystyrene.

In late 1947, this manufacturer brought his new plastic dispenser to the large consumer market, which currently averages $80 million a year in razor blade sales. As a result, the company's blade sales increased far beyond its fondest expectations. In view of the success met by this manufacturer, other razor blade manufacturers sat up and began to take notice—the race was on! Today, this trend has so firmly established itself that every blade manufacturer who isn't using a molded plastic dispenser is investigating their possibilities in the light of the merchandising successes met by those who have.

In a field once plagued by the sameness of advertised products, the plastic dispensers have provided

Razor blade dispensers molded of polystyrene are durable, permit rapid blade changing, cut down packaging operations, and offer consumer sharper edges

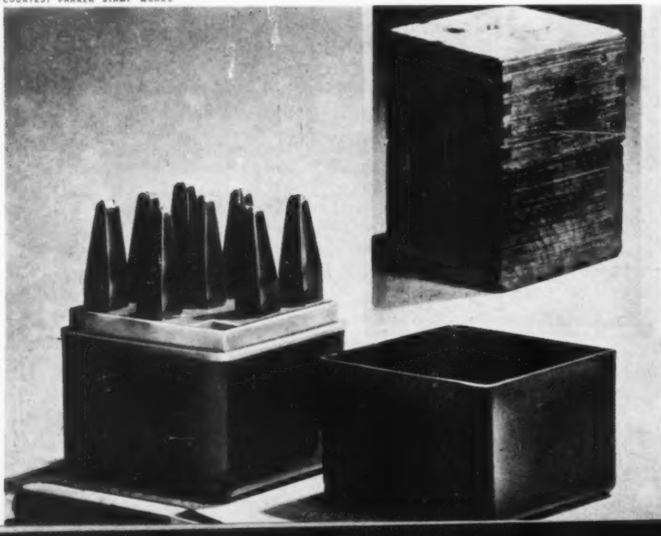
tremendous merchandising advantages: they have provided the consumer with a sturdy package—they have made possible higher unit sales—they have provided ease and speed of blade changing—they have permitted the blades, since they are not touched by any packaging material, to retain their original keenness—they have created a large demand by providing the consumer with a more appealing package—they are economical in that they cut down the number of packaging operations required for the old type paper-cardboard packages—they provide a safer means of loading blades—and they have not increased the retail price of the blades.

In the accompanying photograph are eight typical plastic dispensers. From left to right starting at the top are: Gem Push-Pak, molded by Boonton Molding Co., Boonton, N. J.; Personna single-edge Zipak, molded by Perry Plastics, Inc., Erie, Pa.; Silver Star Whiz-Pak, molded by Boonton Molding Co., Boonton, N. J.; Hoffritz Slide Pak, molded by Plastene Corp., Crawfordsville, Ind.; Pal double-edge Zipak, molded by Commonwealth Plastics Corp., Leominster, Mass.; Gillette Speedpak, molded by Foster, Grant Co., Inc., Leominster, Mass.; Pal injector blade Zipak, molded by Plastics Div., General Electric Co., Pittsfield, Mass.; and Personna injector blade Zipak, also molded by General Electric.

Tradition Broken Profitably

Steel die boxes, formerly wood, now made of acetate. New box is lighter, stronger, and 20% less costly

COURTESY PARKER STAMP WORKS



FOR many years the square steel marking dies made by Parker Stamp Works, Hartford, Conn., were packaged in wooden boxes, the package being a permanent container. Even when brand new, the wooden boxes were not too attractive, and after they had been in use in metal fabrication plants for a very short time they deteriorated rapidly.

It was a revolutionary step for Parker to go from wood to plastic, switching to a three-part cellulose acetate box molded of Tenite I by

Square holes are molded in cellulose acetate box for marking dies

Watertown Mfg. Co., Watertown, Conn. Unit cost of the product plus package will remain the same until mold costs have been amortized. After that time, the cost of the plastic package is expected to be approximately 20% lower than the cost of the former wooden box. Increased appeal of the package has brought about better display on the part of dealers; sales have already increased.

The new box is smaller in outside dimensions, stronger, and lighter in weight than the wooden unit. This makes for smaller storage space requirements, easier inventory, lower shipping costs, and reduced breakage. The molded square holes keep the steel dies in position better than round holes drilled in wood, and allow for easier identification of letters and figures on the markers.

The red and black plastic parts require no finishing, whereas the wood box had to be shellacked or stained. Mold economy was obtained by Watertown's designing of the unit to be produced from only two molds, for the bottom and top sections, and the adapter grid.

25% Saving for Lipsticks

Chemically inert plastic holder and elevator screw make better lipstick package at lower cost

Tube and elevator screw of lipstick package are molded of polystyrene — do the work of four metal parts, permit smoother operation, cost 25% less

LIKE a few other consumer products which were converted from metal to plastics during the war, plastic lipstick holders and screw elevators acquired a bad reputation because of unfortunate misapplications of materials. The dimensional instability of the plastics available for this application during the war, and the leeching of plasticizer from the plastic into the lipstick itself, resulted in the total loss of this market to plastics even when completely stable and chemically inert materials became available after the war, and when design for the use of plastics improved.

Now, Irresistible, New York, N. Y., a major manufacturer of lipsticks, by judicious use of plastics and by means of proper design, has produced a plastic tube and elevator screw—fitted into a gold-plated metal case—which has stood up to field tests and to the more important test of consumer and retail opinion as proved by sales and repeat sales.

Connecticut Plastic Products Co., Waterbury, Conn., molds the metallic polystyrene tube and the red polystyrene elevator screw. These two parts do work for which a metal unit would require four machined components. The plastic unit costs 25% less than a metal unit with the same functions. The product, selling for 39¢ retail, is the longest lipstick for the price ever produced, and the patented plastic elevator has made this possible. The maker states that the combination of the plastic mechanism and the metal housing provide smoother operating action than when made entirely of metal.

PLASTICS BUILD BETTER PRODUCTS AND BETTER VALUES

CLOTHING

PHOTOS COURTESY S. BUCHSBAUM & CO.

Modern vinyl raincoats are highly styled, have electronically welded seams, make use of new materials such as metallic vinyl and simulated leopard skin

Three Out of Five Raincoats Are Vinyl

Case history of one firm shows the rapid strides made in the rainwear field within a single decade

IN 1939, S. Buchsbaum & Co., Chicago, Ill., was manufacturing vinyl belts, suspenders, and wrist-watch straps and marketing them under the trade name Elasti-Glass. Then, according to company president Herbert J. Buchsbaum, "J. R. Price of the Bakelite Corp. walked into my office with a piece of 0.004-in. Vinylite film. He and I agreed it would make a good raincoat, so we stitched up one to see how it looked. It had button holes and buttons, stitched collar, cuffs, hem, and seams—yet it looked fine."

At that time, the average waterproof raincoat was a fairly heavy rubber coat. Some coats were made with rubber linings and cloth on the outside. The lighter coats were either oil-silk or oil-rayon. These coats depended for their water-repellence on the oil which tended to oxidize and destroy the fabric, thus shortening the life of the coat. These coats retailed for anywhere from $5 to $50 each, depending upon the material, style, and make.

Vinyl Enters the Market

In this market, Buchsbaum's first Vinylite raincoats sold readily at a retail price of $7. These early vinyl coats had many defects: the button holes sometimes split, the buttons came off, the pockets tore, the stitches at the hems broke, the thread at the seams wicked the moisture through from the outside. Despite these defects, the coats sold and were reordered because of their light weight, compactness, and smart, new appearance.

While making good on all complaints, Buchsbaum carefully catalogued every criticism and suggestion and began to correct the defects. Then came the war and a *(Continued on page 258)*

Natural fibers, bone and glass, leather, and even rubber are being replaced in clothing and accessories by plastics.

The vagaries of nature with attendant supply and price uncertainty, the high cost of hand labor, and the fact that formerly used materials required much care are the main reasons for this revolution.

Ten million lb. of plastics will be used in rainwear this year. Ten billion plastic buttons will be produced. Over 20 million pairs of shoes will have plastic resins in their soles.

Why Nylon Zippers?

Nylon is lighter in weight than metal, is pleasing to the touch, can be made in a variety of colors, and will soon compete price-wise with metal

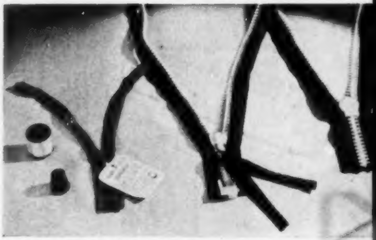
"It is our feeling that, as time goes on, nylon slide fasteners will find their way into more and more products, eventually all but replacing conventional metal fasteners." ***Waldes Kohinoor, Inc. (Manufacturer of nylon and metal slide fasteners.)***

UP UNTIL 1946, most zippers were made of metal—usually brass or aluminum. Then Waldes Kohinoor, Inc., Long Island City, N. Y., introduced its Nylon Zip. Waldes is one of the largest manufacturers of metal zippers and is the sole manufacturer of the Kover-Zip (fabric-covered zipper). But Waldes believes that the nylon zipper will eventually "all but replace conventional metal fasteners."

Injection Molded on Tape

Nylon zippers are made by injection molding the nylon teeth directly onto the tape. In the small chain sizes, the teeth or elements are made of nylon; the tape is cotton; the slider and bottom stops are made of brass. The slider is not made of nylon because the market demands that sliders be as small and unobtrusive as possible. Because of the resilience of the material, a small nylon slider would not be able to maintain its dimensions accurately enough to open and close the zipper smoothly. Brass is therefore used for the slider of the #2 chain-size Nylon-Zip, the size which Waldes is currently producing in quantity.

The price of the nylon zipper has been cut about 45% since its introduction in 1946, and it now sells for about 30% more than aluminum, 20% more than brass, or 10% more than enamelled aluminum zippers. Waldes believes that the price differential is only temporary and that lower raw material prices and a higher volume of production will combine to bring the price of the nylon zipper down to a level where it will be competitive with metal fasteners. The Nylon-Zip now costs



Small zipper has nylon teeth, large ones (note spool size) are all-nylon

from 5 to 10% *less* than the fabric-covered zipper.

One of the greatest advantages of the nylon zipper over metal is its light weight. The nylon raw material weighs about ⅛ as much as brass or less than ½ as much as aluminum.

(Continued on page 258)

Vinyl Toe Caps Take Abuse

British miners' boots now wear three times longer yet cost only 20% more than conventional safety boots

FOR many years, miners' leather boots have been fitted with external steel toe-caps to provide protection in the event of an accident. There were several disadvantages connected with this steel cap. First, the strength of the toe-cap was limited in that the steel had to be malleable to fit in with the manufacturing method. Second, it was difficult to obtain a tight fit between the leather and the metal cap. Because of this, coal dust collected under the cap with resulting discomfort to the wearer. Furthermore, with the ill-fit, water got inside and rotted the boot.

In 1947, G. B. Britton & Sons, Ltd., Bristol, England, in cooperation with BX Plastics, Ltd., London, England, manufacturer of polyvinyl chloride, produced an experimental batch of 1000 pairs of protective boots with toe-caps made of 0.080-in. thick black polyvinyl. As an added protection, the plastic caps were fitted with carbon steel toe protectors. Under test, the boots gave excellent service, and no reports were received of tearing of the plastic material.

A later model of the boot displayed new features. The thickness of the plastic material for the toe-cap was increased to 0.120 in., and polyvinyl chloride was added to the backs of the boots as a further protective measure.

A pair of the latest model of the boots was tested by a miner who had to spend his whole shift kneeling or lying on his side, which transferred all the wear to the toes and sides of his boots. The abrasion to which these boots were subjected was so severe that whereas normal leather boots with metal toe-caps had lasted only three or four months,

Continued on page 258

Miner's boots have vinyl toe caps 0.120-in. thick and vinyl backs. Boot at left was worn in the coal fields for 15 months, is still in usable condition

PLASTICS BUILD BETTER PRODUCTS AND BETTER VALUES

ELECTRICAL APPLICATIONS

Male and female ends of phenolic ducts are joined together for assembly purposes. This system offers low-cost solution to industrial wiring problems

Phenolic Conduit Saves Tons of Metal

Interlocking sections speed installation of new circuits, eliminate costly soldering operations

OVER 1000 lb. of copper and 38,000 lb. of steel were conserved in 8 miles of overhead circuits in a manufacturing plant by using tubular copper conductors enclosed in molded phenolic ducts instead of conventional wiring methods

Developed by the John B. Pierce Foundation, Raritan, N. J., this wiring system minimizes delays in installing new circuits for power tools and lighting fixtures. Known as the Pierceway conduit system of surface wiring, the molded conduits offer a speedy, low-cost solution to the installation of industrial wiring problems.

Interlocking Sections

The phenolic ducts, molded of Bakelite material by Bridgeport Moulded Products, Inc., Bridgeport, Conn., are used to house tubular copper conductors. The new-type conduit system is quickly and easily installed in interlocking sections on ceilings, walls, or benches.

Made in various load-carrying capacities, there are three basic 16-in. phenolic units: a supply or feed unit, used for connecting to any conventional wiring system; an outlet unit that provides for an outlet every 8 in. of circuit run; and a conductor section that is employed wherever uninterrupted lengths are desired.

Assembly is Simple

Each unit has a male and female end which are pressed together for assembly purposes, thus avoiding soldering, taping, and other time-consuming operations commonly necessary when splicing wires in cables.

The phenolic ducts are highly resistant to damage from impact and have excellent electrical properties.

During the war, production plants

employed the Pierceway system in various ways. Some plants mounted the conduits on masonry or on the underside of unfinished ceilings—other plants mounted the housings flush with the ceiling surface, thus forming a continuous line of outlets—still others suspended the housings from ceilings in special hangers where they were used as supports for lighting fixtures—yet others installed the housings along work benches, thus providing a safe and economical means of supplying current to workers on production lines.

These conduits are adaptable to use in homes and offices as well as industrial plants.

In 1910, a few short years after Dr. Baekeland introduced his new thermosetting material, the estimated output of the electrical industry was only 8,480,000,000 k.w. hours. Today, in 1950, this output has grown to an estimated 300,000,000,000 k.w. hours.

Of all the plastic materials that serve the electrical industry, probably the three biggest from the standpoint of consumption are vinyl, polyethylene and phenolic. Of the 295,000,000 lb. of vinyl consumed in 1949, over 30,000,000 lb. went into electrical applications; an estimated 9,450,000 lb. of polyethylene, from a total consumption of around 40,000,000 lb., was used by electrical industry; the consumption of phenolic for 1949 was an estimated 223,100,000 lb. and at least 20% went into electrical applications.

Today, in every branch of the electrical industry, plastic materials are keeping electric current flowing in its allotted path. From the central stations—where plastics are used in panels, arc shields, lead-in tubes, etc.—right through the entire system of transmission lines to the points of consumption in factories, homes, railroads, stores, schools, and hotels across the nation, plastics are providing safety, convenience, and economy.

Silicone Saves on Motor Maintenance

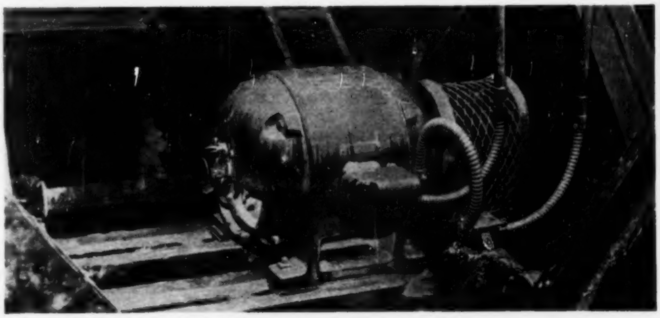
Failures become few and far between when industrial electric motors are insulated with silicone; plant down-time is reduced

EVERY time a 25-h.p. screw-conveyor motor in its mixing house failed, Standard Gypsum Co. of California lost $700 per hour. These expensive motor failures were occuring every 30 to 60 days.

To overcome this costly trouble, Standard Gypsum consulted the Dow Corning Corp., Midland, Mich., and upon their advice installed a silicone-insulated 10-h.p. motor.

The silicone-insulated motor is only one-half the size and weight of the motor formerly used, yet it is still faultlessly performing the same amount of work after eight months of constant usage.

As a result of using the silicone-insulated motor, Standard Gypsum has saved the $700 an hour trouble costs and has been able to increase production, since there is no time loss involved with the new motor.



Silicone insulation for screw-conveyor motor has lowered maintenance costs, stepped-up production in the plant, and increased the power of the motor

High-Voltage Cables Improved

Vinyl and polyethylene insulation provide arc and abrasion resistance. Cost is lower than when less efficient rubber is used

WITHIN the past 25 years, tremendous developments have occured in the neon sign business. The most important of these developments took place in the early 1940's when the commercial production of polyethylene made possible a wire covering that possessed outstanding electrical and physical properties.

Prior to the development of thermoplastics as insulating materials, one of the major problems encountered by neon sign manufacturers was the difficulty of obtaining a cable covering that could be used without deteriorating under continuous high voltage. During this period it was necessary to use ordinary rubber as a cable covering. The rubber was built up to a large size with a cotton-lacquered braid to provide mechanical protection and waterproofness.

Lacquers Burned Easily

The lacquers originally used burned easily with the result that when arcing occurred, the entire

Plastic-coated cable is 20% lighter weight than old-type rubber cable

wiring system of the neon sign burned up. Although the signs themselves were totally encased in metal so that no flame could carry beyond, this method of wire covering proved costly and inefficient for the purpose and the market was wide open for a more reliable cable.

During the 30's, the compounding of corona-resistant, non-arcing, and non-tracking rubbers was successfully accomplished. With this advance in wire coverings, neon sign cables became less of a hazard and more stable. Nonetheless, the improved rubber-insulated neon sign cables still deteriorated under constant voltage and heat, thus necessitating numerous repairs. The repair of neon signs is a higher cost factor than the manufacture of the signs themselves.

Vinyl Resists Abrasion

One of the first cable manufacturers to develop and successfully use an all-plastic insulated neon sign cable was the Chester Cable Corp., Chester, N. Y. The Chester wire is first coated with a $\frac{5}{64}$-in. layer of polyethylene insulation, over which is extruded a $\frac{1}{32}$-in. polyvinyl chloride jacket. The vinyl jacket not only provides abrasion resistance, but gives a greater measure of flame retardance to the new cable.

Known as the Plasticote Oil Burner Ignition & Neon Sign Cable, the Chester-manufactured cable not only carries the 15,000 volts required for such cables, but will also prevent arcing at as high as 50,000 volts. The plastic-covered cable is superior electrically and physically to the old rubber-type cable and is not so expensive. The Plasticote type sells for $30 per thousand feet as against $32 per thousand feet for the rubber type.

Lighter in Weight

Unlike the old rubber-type cable, the vinyl-polyethylene combination, which is U/L approved, will withstand cracking at temperatures ranging from −60 to +160° F. This property has been obtained, the manufacturer states, by an extrusion technique and a specially designed take-off.

Summed-up, the Chester plastic-covered cable has the following advantageous features over previous, non-plastic cable coverings: better electrical properties; longer life; smaller and consequently 20% lighter in weight; flame resistance; easier installation; cheaper; and better weatherproofing properties.

Junction Blocks Cost 2¢ Less

Breakage is reduced through use of phenolic; splices are fully protected; appliance outlet is provided

A PHENOLIC junction block designed for internal wiring in electrical equipment lays claim to such advantages as lower assembly cost, additional wire leads, and substantial labor savings.

The junction block, known as Nu-Blok, Jr., is a product of the United Mfg. & Service Co., Milwaukee, Wis.

The new phenolic block replaces a small cold-molded receptacle junction block. United used the cold-molded block for a while, but found it inadequate in these respects: 1) the material was subject to easy breakage; and 2) the block had capacity for housing only two spliced cords.

Wider Application

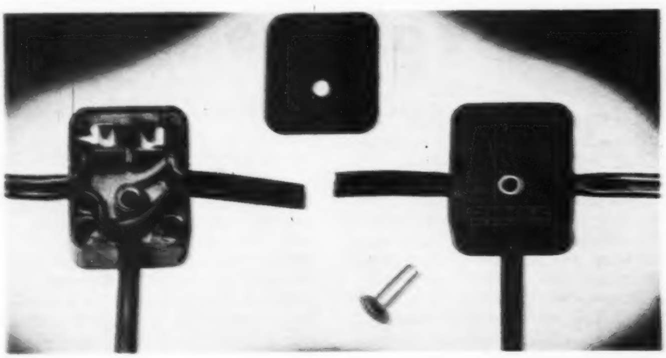
In the new phenolic block, not only has the breakage factor been eliminated, but it also has much wider application without materially increasing the cost. It has further provided for a better means of splice protection.

The block contains an outlet for a standard attachment cap so that it can be used to plug in a lighting circuit, fan lead, or other cords preassembled to components too large to be passed through partition apertures.

In comparison to its old-type cold-molded block, United reports that through use of the phenolic it now saves 2¢ per block. There are additional savings from a labor standpoint.

The unit isolates splices in three segregated wells to prevent short-circuiting. The block has a built-in strain relief and is U/L approved. To date, the block has found applications in such appliances as refrigerators, roasters, and automatic furnaces.

Phenolic junction block isolates spliced wires in three segregated wells to prevent short-circuiting. The plastic unit costs 2¢ less than old-type blocks



PLASTICS BUILD
BETTER PRODUCTS
AND
BETTER VALUES

HOME
APPLIANCES

3 Million Units, 3 Pounds Each

Washing machine agitators in phenolic are being demanded by housewives, who find them easier on clothes

"ALUMINUM gyratators are available and still being supplied, but more and more dealers are requesting plastic gyratators," says a recent statement from the Maytag Co., Newton, Iowa, maker of Maytag washers.

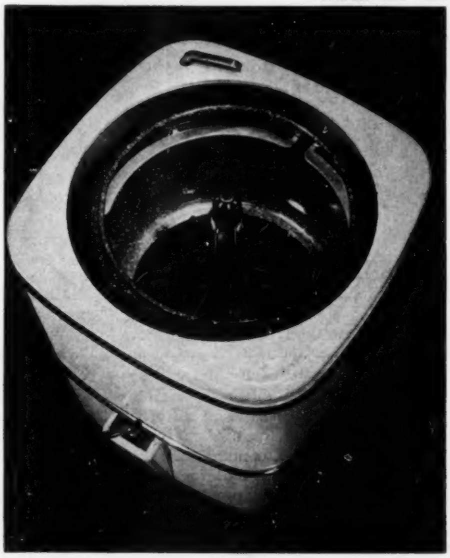
Similar expressions come from most domestic washing machine manufacturers today. The dealers want plastic agitators because the housewives want plastic agitators.

And the reasons? First, the new detergents which have come on the market in the past three years have a microscopic etching effect on metal agitators, roughening them up, while the phenolic plastic remains chemically unharmed. These new detergents lack the slipperiness of soap solutions which acts as a lubricant between clothes and agitators, and the result is that the clothes have a tendency to cling to the metal, putting undue strain on some of the fabrics. Second, the plastic agitator has been proved to produce less lint; it is actually easy on clothes. Third, in many parts of the country alkali in washing water affects metal adversely. Fourth, the plastic agitator costs no more than the metal units, installed in the machine.

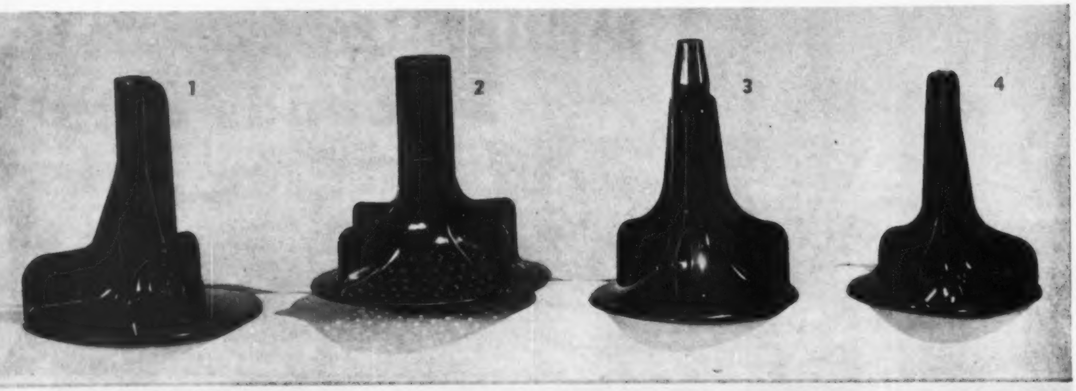
It is little wonder that at least 60% of all washing machines sold today have plastic agitators.

It all started back on Feb. 8, 1927, when the basic and original patent covering plastic agitators was issued to Meadows Mfg. Co. This original patent was broadened by the inclusion of other claims and reissued on Sept. 20, 1927. These patents were acquired with other Meadows assets by Electric Household Utilities Corp., now known as the Thor Corp., Chicago, Ill., in 1934. In 1937 further research was undertaken on plastic agitators which resulted in the granting of licenses under those patents to Bakelite Corp. Bakelite produces two special phenolic ma-

COURTESY THOR CORP.

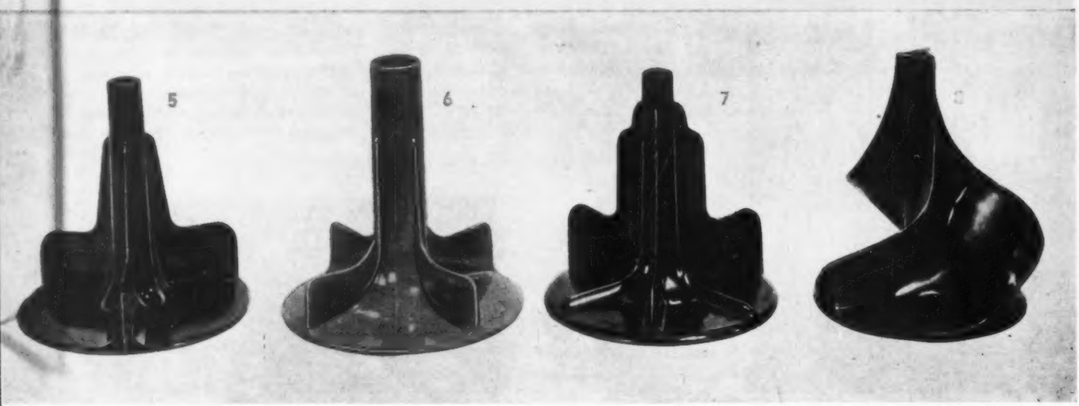


Agitator made of phenolic molded compound in tub of automatic washing machine. Plastic agitator resists effects of washing detergents, avoids undue strain on unit caused by clothes clinging to agitator, and produces much less lint



PHOTOGRAPHS COURTESY BAKELITE CORP.

Examples of various types of plastics agitators currently in use, shown above and below, are: 1) Molded by Modern Plastics Corp., Benton Harbor, Mich., for Nineteen Hundred Corp., St. Joseph, Mich. 2) Molded by General American Transportation Co., Chicago, Ill. for Bendix Home Appliances Corp., South Bend, Ind. 3) Molded by Rathbun Molding Corp., Salamanca, N. Y., for Blackstone Mfg. Co., Jamestown, N. Y. 4) Molded by Modern Plastics Corp., Benton Harbor, Mich., for Nineteen Hundred Corp., St. Joseph, Mich. 5) Molded by Modern Plastics Corp., Benton Harbor, Mich., for Nineteen Hundred Corp., St. Joseph, Mich. 6) Molded by General American Transportation Co., Chicago, Ill., for Maytag Co., Newton, Iowa. 7) Molded by The General Industries Co., Elyria, Ohio, for D. Dexter Co., Fairfield, Ohio. 8) Molded by The Watertown Mfg. Co., Watertown, Conn., for Easy Washing Machine Co., Syracuse, N. Y.



terials for special use in this field—a black and a red molding compound.

Over 3 million phenolic agitators were produced in 1949, weighing an average of 3 lb. each. Many types are made to suit different washing machines which operate on different mechanical principles. The new Bendix automatic Economat, for example, uses a plastic agitator inside a flexible tub which presses in on the clothes by vacuum pressure to accomplish drainage and to dry the clothes by squeezing rather than wringing or spinning.

Voss Bros. Mfg. Co., Davenport, Iowa, uses a plastic agitator that is completely interchangeable with a metal one, and is available in the top bracket Voss machines. This unit operates "upside down" with the agitator floating on top of the water and adjusting itself to the load in the machine. The plastic agitator costs Voss 20% more than a metal unit but it has an improved appearance, is easier to clean, is not subject to soap corrosion, and is a better value to the consumer.

The Maytag unit, also interchangeable with a metal agitator, has become a feature of Maytag merchandising. Its light weight, its standards of performance, and its resistance to heat, cold, and chemicals, are the important sales points.

So firmly established is phenolic in this field that standards for agitators are now based on the plastic.

How Cory Cut Finishing Costs

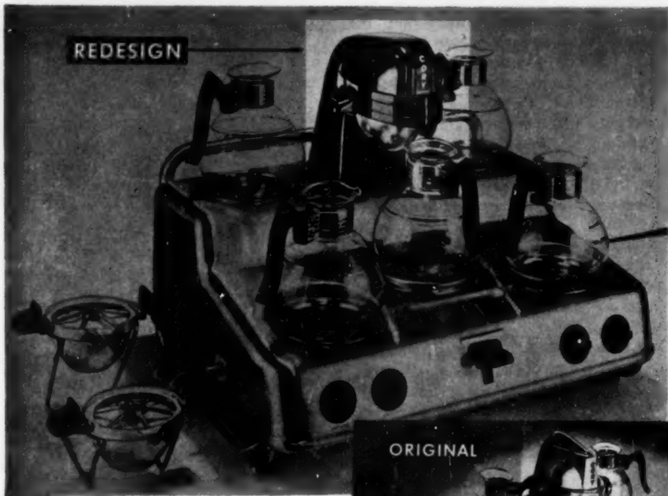
A coffee brewer head made in plastic instead of magnesium costs 50% less, has finer appearance in use

WHEN Cory Corp's. commercial automatic coffee brewer was first introduced, the housing wherein automatic brewing took place was a one-piece magnesium casting. Sales were so good that speedier production became necessary, and to get this speed, redesign of the head in plastics was decided upon.

Because the plastic head comes from the mold with integral finish and thus holds finishing operations to a minimum, Cory was able to reduce manufacturing costs on the head itself by approximately 50% with the phenolic unit. Finishing of the magnesium head involved drilling, facing, and grinding operations and produced chips which had to be carefully disposed of to avoid creation of a possible plant fire hazard.

Since the handsome automatic brewers are prominently displayed in drug stores and restaurants, Cory officials welcomed the improved appearance of the phenolic head. The magnesium unit, which required application of a hammered finish, had a rather rough surface that was somewhat difficult to keep clean.

Another advantage of the phenolic head is the fact that, unlike the



Coffee brewer head made of phenolic offers improved appearance, incorporates provisions for ventilation, speeds production, and features low water absorption

The mushrooming home appliance business attained by 1948 a volume almost four times that which it enjoyed in 1941. In electrical applications alone, aside from refrigerators, sales in 1948 were $613 million. Factors responsible include the increase in marriages during the past few years, the huge rural electrification programs, and generally increased availability of power. Another most important factor has been the improved design of home appliances which incorporated constantly increased applications of plastics.

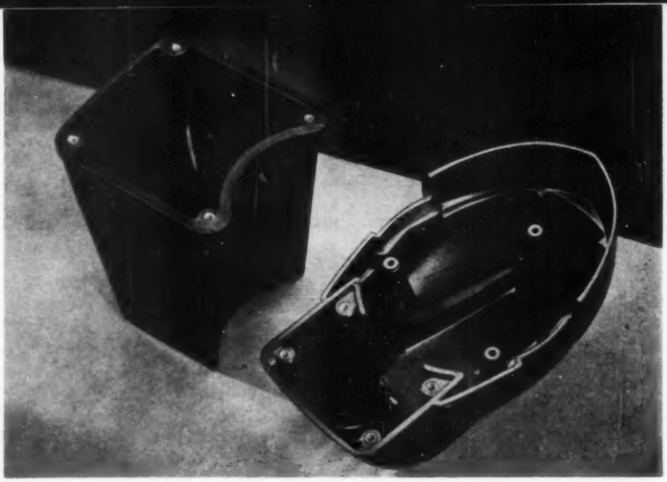
Every vacuum cleaner on the market today uses at least twice as much plastics as its predecessor, the total of plastics used in cleaners amounting to well over 5 million pounds. Iron handles, the first plastic example of which was molded by Mack Molding Co. in 1931 for the D. C. Wood Electric Co., are now entirely plastic, mostly phenolic.

Out of almost 5 million washing machines produced in 1949, 3 million used plastics agitators. The electric fan, the fruit-juice squeezer, the food mixer, the knife sharpener, the toaster, and the coffee percolator, show proportionate progress in the use of plastics.

While the phenolics are most widely used, because of the requirements for high electrical strength materials, for thermosetting properties, and for low cost, literally every plastic is used in some way in the field. Some housings are made of high heat-resistant cellulosics because of their color and impact strength. Many knobs and dials are made of urea as are also some housings. Polystyrene is widely used for small parts, the vinyls for various gasketing purposes, and acrylics for decoration.

In many cases plastics have replaced wood, rubber, and stamped and cast metal. An example is the ethyl cellulose vacuum cleaner wands which have replaced aluminum, and are rapidly becoming standard. In this case, the plastic part proved better at lower cost.

The general result of this trend has been stronger, more durable, lighter, and more beautiful home appliances. And while retail prices have not gone down, the operating qualities and life span of these appliances have been greatly improved by plastics.



Phenolic head for automatic coffee brewer is molded in two sections, needs no drilling or grinding

magnesium unit, it produces no corrosive, darkening reaction on the stainless steel body of the brewer in the presence of coffee fumes. Whereas the design of the metal unit did not incorporate provision for ventilation—and therefore promoted heat build-up which complicated uniform temperature control—the plastic head is designed with ventilating slots which simplify this problem.

The plastic head, which mounts on top of the brewer and encloses a metal tube which discharges coffee into a decanter automatically, is molded in two sections, with knurled brass inserts to facilitate assembly. A point of cost economics entered into the use of a two-part molding. Because of the much lower material costs, the fact that mold costs were twice those of a one-piece molding was offset in even a small quantity run.

Molded Products Corp., Chicago, Ill., produces these parts of a black Durez high-impact phenolic material having very low water absorption properties. In achieving the original goal of faster production to meet increased sales, costs were reduced and a much better looking unit resulted.

Electro-Sweep Switches to Plastics

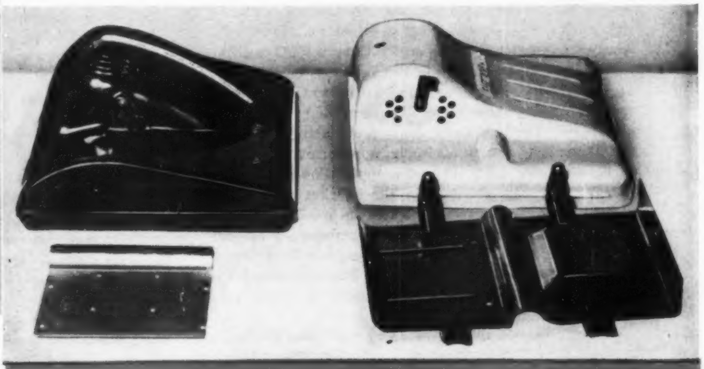
Rug cleaner now has stronger housing that is lighter in weight and produced at lower cost than in metal

BECAUSE the Davis Mfg. Co., Plano, Ill., replaced the stamped-steel, aluminum-lacquered housing of its Electro-Sweep rug cleaner with a phenolic one, it reduced its manufacturing costs by 30%, reduced the weight of the housing by 20%, effected a labor saving in assembly of 10%, increased the strength of the housing, reduced shipping costs, and generally improved the over-all appearance of the cleaner.

Davis molds the housing of walnut-colored general-purpose Resinox phenolic in a single-cavity mold on a 500-ton HPM press. The mold, which is composed of four sections in a yoke, is electrically heated and has three sets of cam-operated core pulls.

Two spring catches are inserted in cored holes while the molding is hot, thus providing a tight shrink fit. This feature, it is reported, saves an extra metal cover and riveting job on the housing.

Phenolic housing for electric carpet sweeper, produced in single-cavity mold, is walnut-colored, has high resistance to impact damage



PHENOLIC METAL

Phenolic was chosen for the housing because of the pleasing appearance it gives in a walnut mottle finish. The factors of light weight and high resistance to damage by impact played important roles in the choice of the material.

Nylon Brushes Used

The Electro-Sweep is an innovation in upright cleaners. Its secret lies in its electric whisking unit, which is a double row of 20 nylon brushes that sweep back and forth at the rate of 3500 strokes per minute. The brushes sweep all dirt into two enclosed dust pans that are positioned at the front and back of the sweeper. The electric motor is completely sealed-off from the dust pans. The cleaner, which is U/L approved, brushes each fiber in a rug 58 times per sec. in two directions, producing a cleaning action which effects a savings in rug cleaning bills and increases the life of the rug.

In redesigning the housing, which weighs only 2 lb. (the whole cleaner weighs only 9 lb.), it was streamlined and made low in height so as to make it easy for the housewife to sweep under furniture.

Through the use of plastics, Davis has been able to eliminate the cumbersomeness of its former metal-housed unit and has given the housewife a low-cost, functional, quality cleaner—attractively finished and smartly styled.

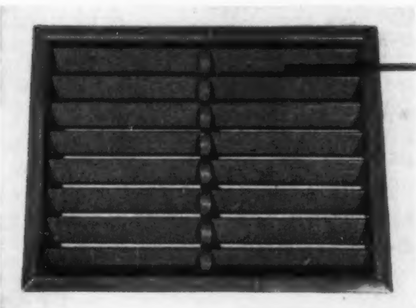
Economics Dictated Plastics

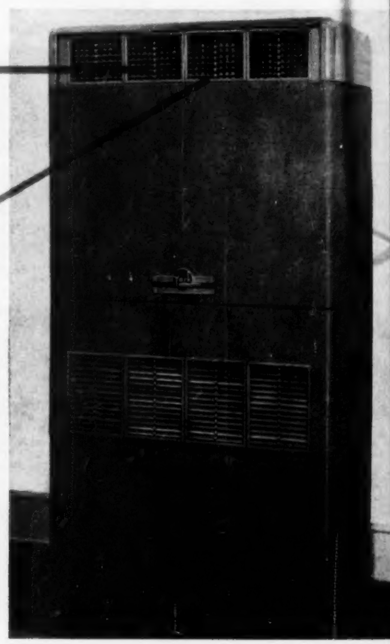
An air-conditioner grille had to be fully adjustable; plastic filled the bill . . . and cost 30% less than metal

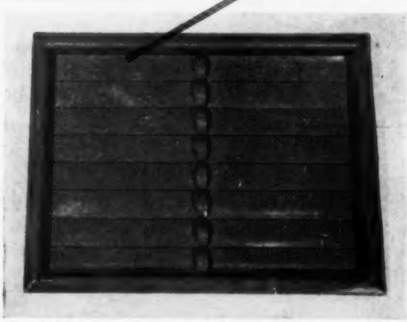
WHEN York Corp., York, Pa. went into planning on its Model 552 Yorkaire air conditioning unit, the matter of grille control became especially important. The units required completely adjustable grilles; that is, the individual louvers had to be adjustable to permit the discharge of air at any desired angle for flexible distribution.

York came to a choice between stamped metal and molded plastics. Development Director W. S. Stair, Equipment Development Engineer A. E. Diehl, and Industrial Design Consultant Ben Nash, on going into the economics of the application, decided on the plastic unit which is molded from Tenite II cellulose acetate butyrate and is produced by American Insulator Corp., New Freedom, Pa.

In addition to obtaining the desired air control, York saved the cost of color finishing metal in production, provided users with a non-rusting and easily cleaned grille, and saved 30% on the cost in comparison to a metal job that would do the same work.







Air outlet grille molded of cellulose acetate butyrate for air conditioner (far right) needs no color finishing. Adjustable air control is shown in open and closed positions

PROGRESS IN 1949

Far more new machines and new processes reached the production stage in 1949 than during any previous year in the history of plastics. The impact of these new machines and processes has been almost instantaneous. They have made possible the manufacture of much larger plastic parts, they have helped reduce costs, and they have made molders more versatile. Finally, they have permitted the plastics industry to enter fields which have hitherto been closed to it either because of the lack of the necessary equipment or the impossibility of molders meeting competitive prices from materials other than plastics.

The injection molding industry has been on a steady climb for the past several years, but 1949 saw the curve rise sharply upward. With the new methods and equipment now available, 1950 should be a banner years for the production of many products in thermoplastics.

Larger Pieces

In both the thermoplastic and thermosetting fields, market research by a number of the major material suppliers has uncovered numerous new fields of application. Many of these markets for thermosetting products required equipment far larger than that available in most molding plants. To meet the growing demand, manufacturers of compression presses and several far-sighted molders cooperated in the manufacture and installation of big equipment.[1] As a result, 1949 saw molded thermosetting pieces produced that were larger and heavier than had ever been manufactured previously. With the experience gained in the production of such large moldings, additional new and highly lucrative markets should be uncovered.

Thermoplastics

The new developments in the thermoplastics field have probably been more numerous and outstanding than those relating directly to thermosetting materials. Injection machines operating on a completely different principle give larger capacities at lower capital investment. Standard injection machines are also available with greatly increased capacities, some of them equipped with special controls for "stuffing." Automatic stuffing makes possible the operation of an injection machine at from 1½ to 1¾ its rated capacity.

Compounding equipment based on the extrusion principle now permits the molder to custom compound and color his material. Such extrusion-compounding equipment requires only a small percentage of the capital investment of the well-known compounding equipment used by the major material suppliers. This custom compounding and coloring equipment enables the molder to reduce the cost of his material. It also eliminates the necessity for a large material inventory, particularly of polystyrene which may be purchased in crystal and colored as required.

Extruder Pump Pre-plasticizer

One of the latest developments in the field of injection molding is a recently announced machine which is essentially a combination of an extruder pump and a clamping press.[2] The unit is novel in that its principle of operation is different yet it is practical because of its simplicity. Simply stated, the machine makes use of an extruder pump for heating the molding material and forcing it into an injection chamber, plus a vertical two-ram transfer-type hydraulic press for clamping the mold and injecting the pre-plasticized material through a sprue and runners into the mold cavities.

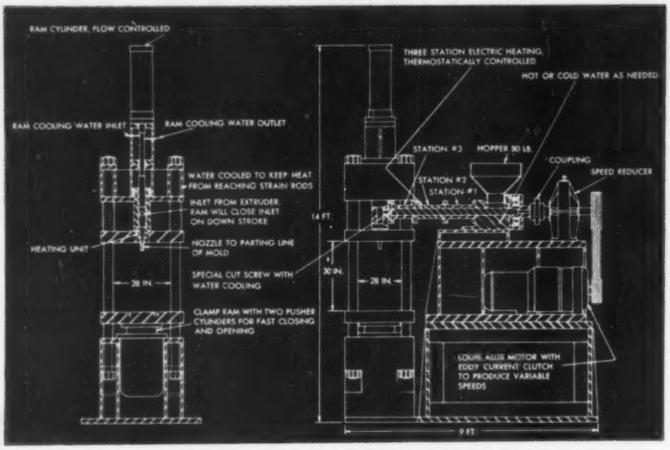
The first press was completed some months ago by its manufacturer, Jackson & Church Machine Co., Saginaw, Mich., and has been operated on numerous test and continuous production runs in the company laboratory. Several additional machines were subsequently installed in molding plants throughout the country.

The first machine with a rated capacity of 48-oz. requires only 81 sq. ft. of floor space and is equipped with a 3½-in. extruder pump of special design. Powered with a 30 h.p. motor, the extruder worm can be brought up to speed in less than one second. This acceleration is possible because the motor runs continuously and is engaged and disengaged by a patented clutch. The extruder pump is mounted on the side of the vertical press in such a manner that the thermoplastic material is fed from the extruder through its die directly into a special type vertical injection chamber. This injection chamber is mounted on a fixed bolster plate which is located somewhat below the head of the transfer-type press. An auxiliary downward-acting hydraulic cylinder is mounted on the head of the press. This assembly is very similar to the auxiliary ram of a transfer press.

(Continued on next page)

[1] See "New Markets Demand Larger Pieces," Modern Plastics 26, 85 (May 1949) and "One Piece Cabinet Weighs 35 Pounds," Modern Plastics 26, 74 (July 1949).

[2] See "Injecting Extrusion-Heated Thermoplastics," Modern Plastics 26, 81 (July 1949).



Schematic layout, partially sectioned, of the main parts of the Jackson & Church injection machine with extruder pump pre-plasticizer

The ram of this overhead cylinder, however, is so arranged that it will travel nearly to the bottom of the injection chamber, but when it is raised or retracted it will not be completely withdrawn. An opening or port machined in the side of the injection cylinder accommodates the die of the extruder. Thus, with the overhead ram in its raised position, the port is open, permitting the extruder pump to force plasticized material into the chamber.

The amount of material thus forced into the injection chamber can be controlled by two methods. By means of a time control on the extruder, it may be operated for a pre-determined number of seconds; by means of a torque control on the extruder worm, the extruder will be automatically stopped when the back pressure of the material creates a predetermined torque. The worm control mechanism, consisting of the timer and clutch, is reported to operate so uniformly from cycle to cycle that the amount of material delivered to the injection chamber does not vary more than ½ of 1 percent. The adjustable torque control operates Micro-switches which disengage the clutch to the driving motor. A similar set of controls serves to start the extruder after the chamber has been emptied and the overhead ram piston raised, opening the port into the chamber.

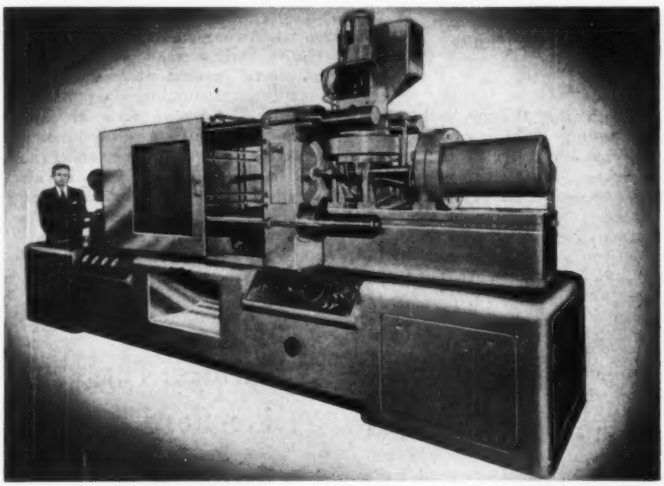
The extruder pump is designed with three heat zones, each separately controlled by Wheelco indicating pyrometer units. Since the material capacity of the third, or high heat zone, of the extruder is equal to the top capacity of the injection cylinder, only uniformly and completely plasticized material will be forced into the injection cylinder during each cycle. Thus the injection piston operates only against completely plasticized material and the injection pressures required are markedly lower than those normally encountered in standard injection molding.

Another feature of the Jackson & Church machine which makes it unnecessary to use high injection pressures is the complete absence of any spreader, or torpedo, in the injection cylinder. With only relatively low injection pressures, it follows that clamping pressure requirements are comparably low. These low-pressure features make possible the use of relatively light construction for the vertical transfer-type press. Furthermore, it is not necessary to use large pumping equipment. It also follows that operating costs are relatively low.

This machine will also be available with injection capacities of 60, 80, and 160 oz., with all of the advantages found in the 48-oz. model carried over into these three larger sizes.

Plunger Pump Pre-plasticizer

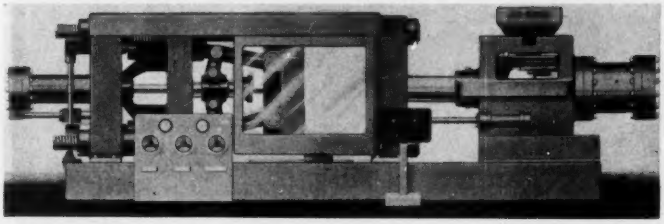
ANOTHER new line of injection machines which departs from the "standard design" also features means for pre-plasticizing. The material is fed through a pre-plasticizing chamber by a reciprocating plunger, and it is claimed that as the material leaves this chamber it is fully plasticized. In operation, as the injection piston is retracted after the injection stroke, it opens a port in the chamber leading to the pre-plasticizing unit. Immediately this port is opened, the plunger of the pre-plasticizer proceeds to force material into the injection chamber until this chamber is full. When the chamber is filled it stops the operation of the plunger in the pre-plas-



In the Crown injection machine, which uses a plunger pump pre-plasticizer, positive clamping is achieved by rotating a thrust plate

ticizer due to the back pressure created.

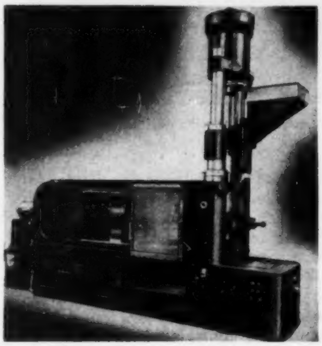
These new machines, products of Crown Machine and Tool Co., Inc., Fort Worth 7, Texas, have capacities of 32 and 56 oz. and clamping pressures up to 750 tons.[3] A small, long-stroke cylinder closes the molds, and the clamping pressure is obtained by rotating a thrust plate which transfers the thrust of the clamping force to the rigid frame. This permits the use of a large clamping cylinder having a very short travel for final clamping under high pressure. With the mold clamped, the injection piston operates on material which is in a semi-fluid condition. Because of this, friction is reduced to a minimum and injection as well as clamping pressures are low.


Latest injection machine by Reed-Prentice has 60-oz. capacity

Larger Capacity Injection Machines

THREE companies announced the addition to their lines of newly designed large capacity injection machines of the so-called "standard type."

Watson-Stillman Co. of Roselle, N. J., placed in production a standard single-shot automatic 48-oz. machine[4] which is provided with an automatic stuffing arrangement said to increase the rated capacity by 40 to 50 percent. This stuffing arrangement allows for more than one stroke of the injection piston during each cycle and its automatic control insures that the injection piston will stuff accurately at a pre-determined point on the second stroke.


Compensating feeder is feature of new Lester-Phoenix machine

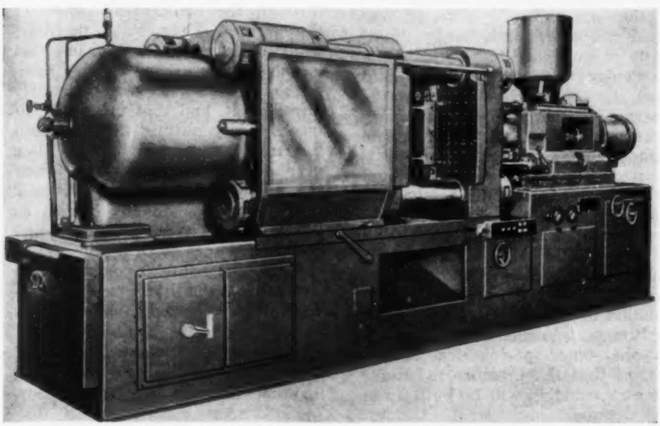
The heating cylinder of this unit is designed to deliver near-capacity shots of such "derating" materials as polystyrene. The electrically controlled material feed is self-compensating. Both injection plunger and clamp ram have speed and pressure adjustments. Automatic slow-down and slow-break at mold-opening permit high speed approach and return travel of the clamp ram without danger of mold damage. The stainless steel hopper receives a barrel of plastic, and the plasticization capacity of the machine is approximately 200 lb. per hour. The unit is equipped with a 1000-ton clamp; daylight opening is adjustable to 54 in. maximum. With a die area 30 by 50 in., this machine is operated by a 60-h.p. motor.

Lester-Phoenix, Inc., Cleveland 13, Ohio, announced a 48-oz. injection machine[5] similar in design to this company's other units, in that it has a vertical injection unit and a horizontal clamp. The clamp frame is a box type made of a heavy one-piece alloy steel casting strong enough to permit, with a high factor of safety, the use of a 750-ton clamp. The injection cylinder has a solid plunger and a one-piece electrically heated torpedo with separate temperature control.

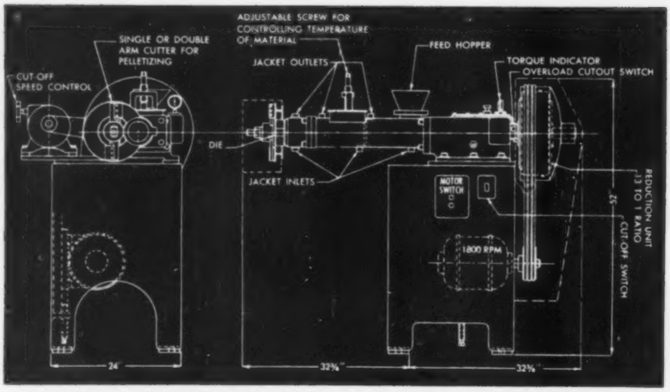
Heating of the injection cylinder is accomplished with three separate resistance-type external heaters, each with its own temperature control instrument. A new cylindrical compensating feeder fills the injection cylinder at each shot in exact proportion to the previous shot. The machine is designed to take a 29½ by 40 in. stationary die plate and a 29½ by 34 in. movable one.

A new 60-oz. injection molding machine[6] was announced by Reed-Prentice Corp., Worcester 4, Mass. Its capacity of 60 oz. is rated for cellulose acetate and its rating on polystyrene is 48 ounces. It has a plasticizing capacity of about 250 lb. per hr. and its 1000-ton clamp allows for a maximum casting area of 354 sq. inches. The dimensions of the die plates are 60 by 60 inches.

Piping, electrical controls, and hydraulic equipment are mounted as a separate unit outside the base of the machine. The height of the machine is such that the center line


The 48-oz. Watson-Stillman injection machine has automatic stuffing

[3]See "Injection Molding Machines," MODERN PLASTICS 27, 126 (Nov. 1949).
[4]See "Forty-Eight Oz. Injection Molding Machine," MODERN PLASTICS 26, 124 (April 1949).
[5]See "Forty-Eight Oz. Vertical Injection Molding Machine," MODERN PLASTICS 26, 130 (Feb. 1949).
[6]See "Sixty Oz. Injection Molding Machine," MODERN PLASTICS 27, 132 (Sept. 1949).



Schematic layout of Welding Engineers' extruder-compounder with pelletizer

of the heating cylinder is only 50 in. from the floor. The hydraulically operated toggle clamp permits of a 24-in. maximum movement of the movable die plate and the stroke can be shortened for thinner molds. The same type copper core heating cylinder which is used in other machines of this company's manufacture is employed in this 60-oz. unit. A new wedge-type clamping device holds the heater in place and permits easy mounting and removal. This machine is operated by an 80-h.p. motor and permits use of a maximum of 24,500 lb. p.s.i. injection pressure.

Extruder-Compounders

Two new multi-screw extruders designed specifically for compounding, extruding, and pelletizing in one operation were announced in 1949. In June the Machinery Div. of Welding Engineers, Inc., in Norristown, Pa., announced a line of universal compounding-extrusion machines[7].

These machines are designed with two worms rotating in unison within an extrusion chamber. This chamber has three distinct sections. The first is the feeding and compounding section, the second is the secondary compounding section, and the third is the extrusion section. The two worms rotate within the chamber of the compounding sections, the walls of which are machined to the shape of a figure eight. The two worms are of different lengths. In the back portion of the machine—that is, from the hopper opening for about one-half way along the barrel—both worms participate in the operation of kneading and compounding and heating the material. After the material has been thus prepared, it moves forward to the portions of the worms which extrude it from the die. Here, the figure eight contour of the compounding chamber streamlines into the conventional single opening of an extrusion chamber, through which the main worm extends.

At the end of the machine, prior to the die, the chamber has external threads machined on it. These threads mate with internal threads on a die nut which is used to fasten all types of dies quickly on to the barrel, each die simply having a shoulder of the appropriate size to fit the die nut.

The flights of the worms in each section are radically different one from the other, each being differently proportioned to accomplish its particular function. In order to hold back the material in the compounding section and thus create the heavy pressure necessary for complete compounding, a pressure plate is located on the top of the worms and at the forward end of the compounding section of the machine. This pressure plate is shaped in the form of a "V," the legs of which are concave. This shape permits the pressure plate to be positioned with relation to the worms so that it can be brought into such close proximity to the outer peripheries of the worms that the pressure necessary for compounding will be built up in the chamber.

When it is desired to use one of these machines for the production of pellets, a simple single or double blade rotary cutter is assembled into position at the die end of the machine. This cutter, together with the necessary bearings, shaftings, variable speed drive, and a small electric motor, constitutes the additional equipment necessary for pelletizing. When pelletizing, a simple rod die is set up on the die adapter and the cutter adjusted so that the blades wipe across the front face of the die.

The diameter of the pellets is controlled by the diameter of the holes in the die. The length of the pellets depends upon: 1) the speed of extrusion and 2) the speed of the rotary cutter. The faster the knives are rotated while the extrusion speed remains fixed, the shorter will be the length of the pellets; maintaining knife speed and changing extrusion speed will also vary the pellet length. Since the thermoplastic material is quite soft when it emerges from the die and is cut, this pelletizing operation produces shapes which vary considerably in contour with different material. For example, an elastomeric vinyl pelletizes into rod form with the two ends of the pellet practically flat; a harder material such as polystyrene forms pellets which approach the shape of round beads.

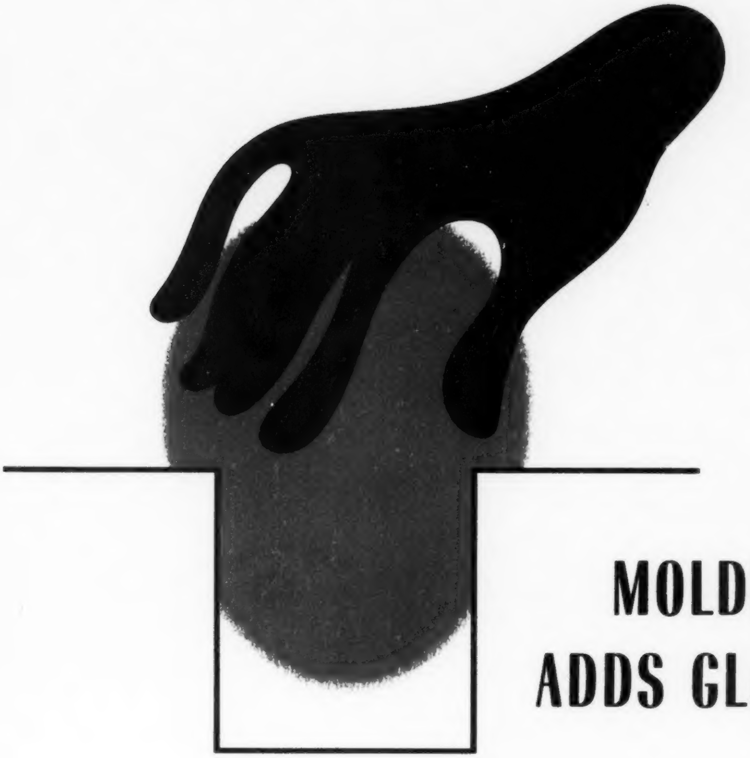
According to Welding Engineers, Inc., research engineers, jacket temperatures on these compounder-extruders are not critical. A deviation of 20 to 30° C. in the jacket has shown little effect on the operation of the machine. Due to the design and action of the two worms in this machine, as well as the use of the pressure plate which traps the material in the compounding chamber, the major amount of heat added is that generated in the material through the mechanical action of the worms. They state that the action of the worms in their machine is one of pressurizing a large mass of the material while simultaneously kneading it, and that the action of mechanically putting the heat into the material results in very low gradients of temperatures between the cylinder walls and the material.

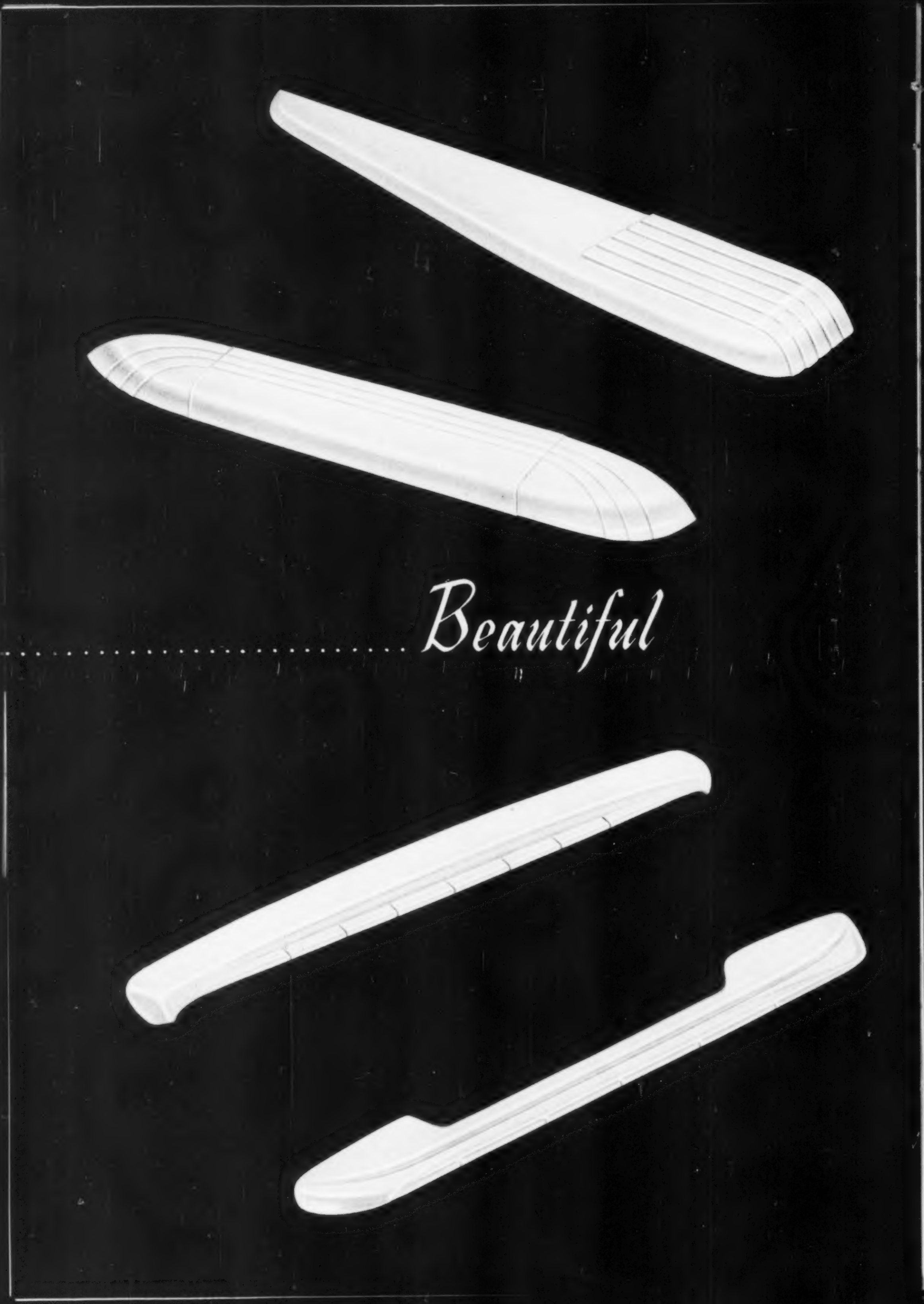
This effect, commonly known as mechanical heat, permits the cylinder temperature to be below that of the material being compounded. In some cases, this difference in temperature is reported to be as much as 40° C.

The second extruder-compounder, announced in October, is being manufactured by R. H. Windsor, Ltd., London, England, and distributed by Jackson & Church Co.,

(Continued on page 197)

[7] See "Compounding and Extruding in One Unit." MODERN PLASTICS 26, 87 (June 1949).

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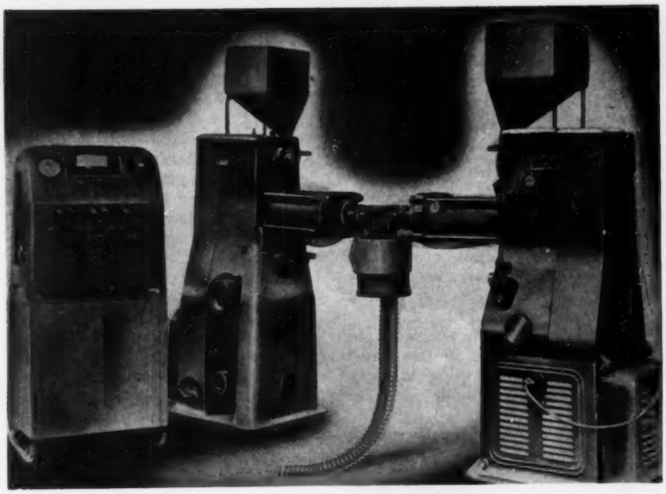
Upper four designs by D. L. Hadley, Meriden, Conn.
Lower four designs by J. M. Little and Associates, Toledo, Ohio.



Two Windsor extruder-compounders operating through a cross-head

Saginaw, Michigan. It also is a multi-screw unit.

The fundamental principal of the Windsor machine[1] can be summed up as follows: Two screws, with threads meshing with each other, are each divided into three sections with different diameters and threads. The pitch of the mating flight sections on each screw is the same, thereby permitting the screws to turn in the same direction without interference. On the 90-mm. (3.54 in.) extruder, the outside diameters of the three-flight sections diminish from feed to die end. Since the worms are closely meshed, the shaft diameter must increase by the same amount as the flights decrease in order to maintain a constant relationship between them. Also, as the worms become smaller in diameter, their shape changes, the flights becoming progressively finer in steps, the coarser one being at the feed end where the worms have the largest diameters.

The feed section of each worm has four turns of thread, the next has five, and the final or extrusion end has 14. The first two screw sections compress the material, fed in powder or granular form from the hopper, while the third section, with its many turns of threads, thoroughly mixes the material, raises the temperature to melting point, and builds up the required extrusion pressure. Shaft shoulders resist any back pressure from the material.

The inside walls of the extrusion chamber are shaped somewhat like a figure eight. They are reduced in dimensions to follow the reduction in diameter of the three worm sections. By this design the walls of the chamber are at all points equally spaced from the outside peripheries of the screws.

The actual screw section diameters on the 90-mm. (3.54 in.) machine are 90 mm. at the feed end, 85 mm. (3.35 in.) in the center section, and 80 mm. (3.15 in.) at the extrusion end. The corresponding shaft diameters are 40 mm. (1.58 in.), 45 mm. (1.77 in.), and 50 mm. (1.97 in.).

Important to the operation of this extruder is the feed of material by means of an automatic volumetric charger mounted in the mouth of the hopper. This charger is provided with a speed control so that the quantity of material to be extruded may be increased or decreased as desired. No external vibrators or other agitating devices are used.

The machine is run by a three-phase, 5-h.p. motor, but it is reported that this horsepower is never wholly absorbed when the machine is operating normally. The speed of the extruder screws is variable in three steps so that the material can be held for a longer or shorter time in the extrusion chamber, as required by conditions; this is especially important when handling polyvinyl chloride. Automatic circulation of lubricating oil and an oil cooling device assure fully adequate machine lubrication.

Separate electrical heating units with thermostatic controls are provided for the extrusion chamber, the die attachment nut, and the dies themselves. Power requirement of the heaters is 2 kw. for the chamber and 0.8 kw. for the die attachment. Current consumption of the die heater varies, depending upon die size. These figures indicate the low current cost of operating the machine; since the extruder operates automatically, labor costs are also low. The net result is high production economy.

The manufacturer claims that successful compounding of thermoplastics in this extruder is mainly due to the reduced space between the screw threads from the loading end of the machine to the outlet. This reduction in turn causes a change in the specific volume of the material being processed and aids greatly in fully dispersing the ingredients of the mix. It also aids in building up pressure at the extrusion die. The material can not back up to the charger mouth or stick on the screws, because the thread of each worm is continuously pushing material through the corresponding thread of the other.

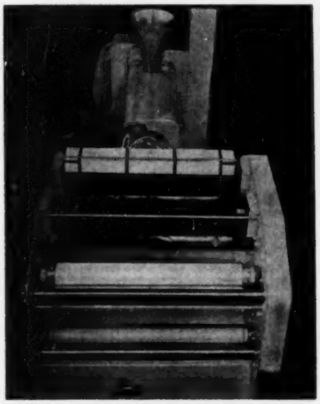
[1] See "Meshed Multi-Screw Compounder-Extruder," MODERN PLASTICS 27, 97 (Oct. 1949).

Film by Extrusion

PRACTICALLY all, if not all, of the thin-wall (0.0005 to 0.005 in.) polyethylene film produced today is made by extrusion. Two methods[2] are employed: 1) sheet extrusion by the slot die method; 2) the large diameter, inflated tube process.

Slot die method—For sheet extrusion up to 72 in. or wider by the slot die method, any good extruder fitted with a die about 2 in. wider than the desired finished product will prove satisfactory. The extruder

[2] See "Extrusion of Polyethylene Film," MODERN PLASTICS 26, 97 (Aug. 1949).



COURTESY MODERN PLASTIC MACHINERY CORP.

End view of sheet extrusion unit, showing wind-up and driving rolls

should be efficiently heated and equipped with accurate temperature control systems if a uniform product is to be produced. The die itself, of rugged construction to prevent leakage under pressure, should be equipped with heaters, the adjustment of which is one of the factors in controlling the thickness of the sheet. Best results are usually obtained when the die is electrically heated.

The construction of a die having an opening possibly 0.005 in. wide by 72 in. long requires tool-making ability of the highest order. The slot must be absolutely uniform over its entire length. No cost-saving short cuts can be permitted in the construction of such a die. Second in importance only to the dimensional accuracy of the die is the uniformity of temperature over the entire die length. The heating elements should be disposed along the die so that there will be no more than a 2° variation in temperature throughout the die.

In addition to the special die on the extruder, a water trough about a foot deep and a foot longer than the width of the sheet is required. It is adjustable for height so it may be lowered while changing dies. A ½-in. inlet plus a 1-in. drain is needed to properly control the water flow in this trough. Mounted in the trough is a roller which serves to carry the sheet under the water.

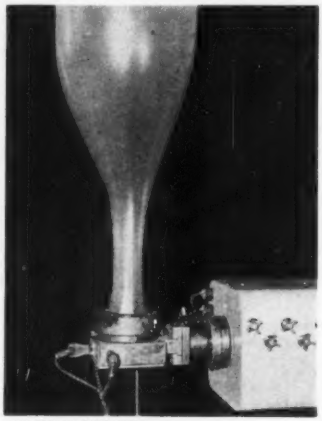
Other equipment needed for sheet extrusion includes a driven pair of rubber-covered pinch or pull rolls, two sets of rubber-covered trim rolls, a set of rotating knives, and take-up rolls.

For producing uniform polyethylene sheeting approximately 0.003 to 0.004 in. in thickness, the extruder and die temperatures of a four-zone extruder, for example, are set as follows: the hopper end is held at 350° F., the next zone toward the die at 380° F., and the die zone plus the die itself at from 400 to 430° F., according to the thickness of film desired. For best results, the feed hopper should be water cooled.

When the various zones come up to temperature, the extruder is started at a comparatively slow speed. As the film begins to issue from the die, it is manually carried down into the water trough and underneath the roller. Just prior to starting the operation, the water trough should be raised so that the surface of the water is approximately 1 in. below the die. As the film continues to issue from the die, the operator, keeping a slight tension on the material, passes it between the pull rolls. He continues to carry the end of the sheet through the first set of trim rolls and thence between the rotary trim knives to the second set of trim rolls. The sheet is then given two or three turns around a paper tube take-up roll.

The take-up roll rides between two driven steel rolls, set approximately 3 in. apart. As the diameter of the film on the roll builds up, surface speed does not increase because the roll is riding between the above-mentioned rollers which have a speed slightly greater than that of the rubber pull rolls.

The thickness of the sheet can be decreased by increasing the speed of the pull rolls (pulling it away from the die faster while extruder screw speed remains constant); this will stretch the film and make it thinner. Conversely, reducing this speed will make the film thicker.



COURTESY BAKELITE CORP.

Inflated tube extrusion, showing tube inflated to 16-in. diameter

Inflated tube process—In contrast to sheet extrusion of thin polyethylene film, inflated-tube extrusion, the newest of all methods, does not require a large die. The tubing is extruded vertically, either upward or downward, and passes from the die to a pair of idling squeeze rolls. These squeeze rolls are adjustable as to their distance from the die. The equipment must be designed so that this distance may be varied up to 10 or possibly as much as 12 feet.

The tubing passes from the squeeze rolls to a pair of rubber-covered pull rolls and then through two additional sets of rolls between which are mounted the rotary trim knives. It is then carried to a take-up similar to the one discussed previously except that two sets are required because two sheets are produced simultaneously.

In producing sheet from tubing, the trim knives are adjusted so that they cut the outer edges of the flattened tube. The small amount of scrap can be immediately fed back to the extruder for re-working. If continuous lengths of thin-wall tubing are desired instead of sheeting, the material can be carried directly from the first set of pull rolls to the roll-up mechanism.

In operation, the extruder and die temperatures are set at the same readings as those required for the production of sheet. The extruder is started and, as the tube issues from the die, the operator pulls it, keeping a slight tension on the tube until he has sufficient length to pass the end through the set of squeeze rolls which are mounted at a distance above the die.

The operator then pulls the tubing down until he has sufficient length to pass it through the first set of pull rolls and thence through the trimming and wind-up mechanism.

At this stage in the operation the tubing will be approximately the same diameter as the die. This die, however, is equipped with a small pipe so arranged that air can be blown into the inside of the tube. As air is admitted under pressure to the tube, it is trapped within by the squeeze rolls. The operator continues to admit more air until the tube has been stretched to the required diameter. It is of the utmost importance that this air be blown into the tube at a uniform rate. Surges of air will create bulges in the extruded tube and, as these bulges pass through the squeeze rolls, the sudden rise in internal pressure will cause a second bulge just above the die. If this occurs it is necessary to slit a hole in the tube, permit the air to escape and then repeat the operation of admitting air after the ruptured portion of the tube has passed beyond the squeeze rolls.

If the tube does not have a uniform wall throughout its entire cross-section, this condition will immediately be apparent from the shape of the tube itself; the thinner section will bulge out more than the thicker section. This defect is corrected by shifting the position of the center pin in the die. Most dies are constructed so that this pin can be shifted by means of set screws. The operation of correcting for non-uniform wall thickness is greatly facilitated by the immediate change in the shape of the tube which occurs as the center pin is adjusted. Accuracy is obtained by visual inspec-

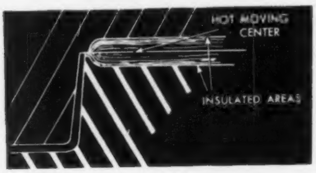
tion rather than by a measuring operation.

There is no doubt that both of these extrusion methods have their place in sheet production, with thicker material produced by the wide die and the inflated tube method manufacturing film ranging from 0.0005 to 0.002 in. in thickness.

Pin Point Gating

PINPOINT or restricted gating is a relatively new technique which is rapidly being adapted to many injection mold designs. "Pointers On Pin Points"[10] reviews the work done at Caco, Pomono, Calif., during the past few years.

From the evidence that has been gathered, a basic flow pattern has been established which influences the design of every mold made in the Caco plant. This pattern stems from the theory that the thermoplastic material flows from the center out and lies against the confining walls of the runners, cavities, and cores. This forms an insulating area with the hot material moving through the center.



Pin point gating theory involves flow of material through runners

Caco reports that it at present is using only two types of pin point gates. One is the round gate; the other, the rectangular gate. These two types are adequate for any requirements. The round design is used and preferred where the gate can be cut on both sides of the parting line, or where an independent sprue is used. The tapered rectangular gate is used where only one side of the parting line can be cut.

In the old style designs, the runners and gates were cut in one side of the parting line. This is one reason such high pressure was required to fill the cavity. The insulating area choked the gate with cool material, and prevented the hot center from having easy access to the cavity. In the modern design the material is directed into the cavity in a natural way—through the center. The size of the gate should be from 0.0002 to 0.001 sq. in. in area, depending upon the size of the molding, number of cavities, and type of material. (Styrene smallest; acetate next larger; methyl methacrylate largest.) If the gate size/wall thickness ratio at the gate is less than 1 to 2, there is danger of the gate pulling a hole in the part. To produce the cleanest molding, a taper of 30° should be cut in the gate. This will allow the gate to break even with the molding. In a multiple cavity mold these gates should be within 10% of each other in size.

The art of pin point gating was materially advanced by including the principles of restriction of material flow in the mold design. Ideally, the material should reach each cavity at the same instant. To assure that this will happen, the runners are reduced in size as the cavities are approached. With these restrictions in size, the material is retarded at each turn of the runner and reaches all cavities simultaneously. The runners need only be smooth enough to assure easy removal of the plastic. The size of the gate runner should be five to 10 times the gate size, depending upon size and shape of molded piece.

Where there is great variation in size and shape of parts in one mold, it is found necessary to restrict the gate size of the smaller parts to control the density of the moldings. This will assist in keeping the shrinkage rates the same in all sizes.

One other factor that is equally as important as restricted flow is a balance of cavity layout. As each cavity has exactly the same pressure applied, the parts are exactly alike. This precision makes possible the economical mass production of an interchangeable accurate part with remarkably close tolerances. When precision parts are not required but small gates are desired, a conventional runner system can be used by cutting the sprue runner quite large in cross section, and the lateral runner short in length.

Pin point gates cut with a taper produce the cleanest moldings

A recently developed design feature is termed "deflected gating." The thin hair of material passing through the small gate into a large cavity tends to cool beyond the point of good welding by the time the cavity is filled. By deflecting the stream against a wall, instead of directing it out into the cavity, the material immediately builds up a mass in which the two insulating walls and the basic flow pattern is set up. This is especially valuable in heavy, transparent moldings where weld lines are objectionable.

A Machining-Hobbing Steel

A NEW steel which is satisfactory for practically all hobbing operations, yet at the same time has excellent machining characteristics, was announced[11] by The Carpenter Steel Co., Reading, Pa. This steel bridges the gap between machining steels and hobbing iron in that it has many of the features desirable in all mold making operations. This case hardening alloy has the following average properties:

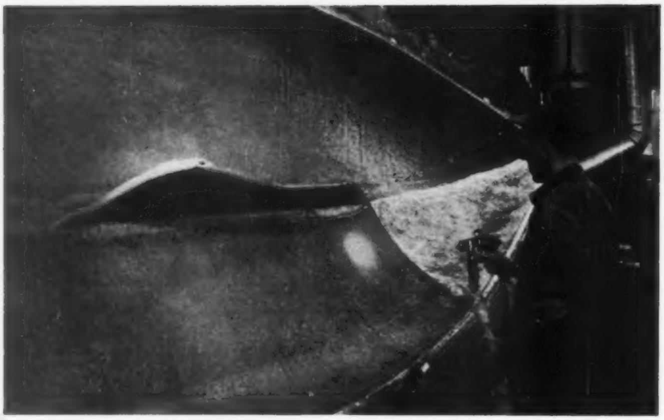
	Oil quench	Water quench
Case hardness—		
Rockwell:	**C-64**	**C-65**
Core hardness—		
Rockwell:	**C-20**	**C-25**
Core properties—		
Tensile:	**108,000 p.s.i.**	**120,000 p.s.i.**
Yield:	**69,000 p.s.i.**	**91,000 p.s.i.**

It will be noted that the yield strength of this steel when oil quenched is double the 38,000 p.s.i. of a good grade of hobbing iron. This eliminates the sinking problem mentioned previously. The manufacturer claims that this steel machines very satisfactorily because of its combination of elements and control in manufacture. Specifically, it states that the absence of nickel in this alloy is the paramount reason for its excellent machining qualities.

In tests of this steel to ascertain its hobbing qualities, a mold blank 1.75 in. in diameter by 2.25 in. long was used. A hob measuring 0.910 in. in diameter tapered 0.045 in. per in. was sunk into this mold blank using a load of 113 tons with one push. A depth of cavity measuring 0.71 in. was obtained. This compares with a cavity depth of 0.82 in. obtained with dead soft iron using the same size mold blanks and hob. Again

[10] MODERN PLASTICS 27, 108 (Dec. 1949).

[11] See "General Purpose Steel," MODERN PLASTICS 27, 108 (Oct. 1949).



Spraying resin as part of no-pressure production of laminate boat

using the same hob, a depth of only 0.48 in. was obtained with steel having the following analysis: carbon 0.10%, nickel 1.30%, and chromium 0.70%.

Although the steel had not been generally announced previously, Carpenter Steel felt that before it was placed on the open market it should be offered to several mold makers and the results closely followed. The case histories bore out the laboratory results obtained by Carpenter.

No-Pressure Laminating

THE Beetle Boat Co., Inc., New Bedford, Mass., is currently producing 15 glass laminate boats per day, using simple, inexpensive plastic forms and an oven. These boats range in size from an 8-ft. pram to a 15-ft. outboard and are made of a Fiberglas-Laminac combination.

The Beetle system[12] requires only a smooth male facsimile of the shape to be molded. This facsimile may be of any firm, workable material such as paper, plaster, cement, or wood. The Beetle permanent mold is made from a glass-resin laminate similar to that used in the boats themselves. The glass mat is laid up on the male facsimile and cured. Although the resulting plastic molds are permanent—that is, they can be used for producing an indefinite number of finished pieces—large production requires the use of several. As many more molds as are needed can be made on the same male facsimile.

These finished molds are mounted in plywood boxes with the tops open. The box for the hull mold has short lengths of shafting bolted to each end, which are supported about 4 ft. above the floor by "A" frames. The shafts are free to turn in the "A" frames, thus permitting the entire mold assembly to be rotated on its long axis. This permits ease of lay-up and resin application. The removal of the laid-up boat is accomplished by turning the mold on its side and manually withdrawing the lay-up from the mold. The deck molds do not require this rotating feature because of the ease with which the operators can reach all sections of the mold surfaces during laminating.

Large air ducts connected to the plywood boxes serve to circulate air at a controlled temperature around the under surface of the mold. Inasmuch as these lay-ups cure without pressure, no rubber bags with their necessary parting agent are required.

The lay-up operations follow generally the usual techniques. A parting agent is first sprayed on the mold surface, after which a layer of resin containing a large percentage of mineral filler is sprayed on the parting agent. Successive layers of glass mat cut to pre-determined pattern are next laid in position in the mold. Each layer of glass mat is sprayed with the resin mixed with accelerator.

From this point on the intricacies of bag molding are eliminated. The deck and hull sections are separately allowed to reach a gel stage at which point the sections are sufficiently strong to handle. The deck lay-up is then removed manually from its mold and placed in position on top of the hull. Additional resin and mat are next applied at the joint so that when final curing has been completed the two parts will have become a single homogeneous structure. After the resin applied to the joint has reached the gel stage, the complete boat is removed from the hull mold to a carriage and rolled into a large oven where final curing takes place. After curing has been completed, the surface is sanded and the boats are sprayed with standard automobile lacquers.

[12] See "Mass Production Boat Molding," MODERN PLASTICS 27, 103 (Sept. 1949).

Foundry Matchplates

A METHOD for producing phenolic foundry patterns or matchplates[13] has eliminated the difficulties heretofore found in these products. Instead of casting the pattern and plate in one piece, only the pattern is produced in phenolic. An undercut groove 1/16 in. deep is routed on the outside edge of the pattern. A matchplate of plywood or aluminum has an opening cut into it to match the pattern outline. A 1/16 in. groove is then machined into the edge of this hole, after which a pouring hole and a vent hole are drilled from the outside edge into the center opening. After the pattern is positioned in the opening in the plate, a low melting alloy such as Cerrobend or Woods alloy is melted and poured into the pouring hole. It flows around the precut grooves in the plate and pattern and is vented through the vent hole. Upon hardening, the alloy locks the pattern and plate together.

This patented method, known as the "Schumacher Process," eliminates the use of any external fastening device and combines the strength of wood or metal with a plastic pattern that cannot be mismatched. Other advantages include: savings in cost of from 50 to 75%; broken patterns can be replaced at low cost; only one pattern is required to produce multiple pattern matchplates; matchplates can be made by men with little experience; precision matching of patterns can be accomplished with a minimum of care; no shifting of patterns is possible; and no expensive equipment is required.

[13] See "Plastics Foundry Matchplates," MODERN PLASTICS 27, 95 (Nov. 1949).

Molded of tough, colorful Tenite, the head and handle of this brace are endowed with durability plus a striking appearance which is certain to attract sales. Tenite is proof against shattering, and its uniform, grain-free texture offers resistance to cracking or splitting from use or exposure. The lustrous surface of the plastic is pleasant to the touch and easy to clean; the color is chipproof. The clear red Tenite allows full visibility of a printed trade-mark set underneath the plastic head.

A practical material for tool handles, Tenite is suited to many other types of products as well. It is available in a wide range of formulas and flows to meet different use requirements, and can be matched to any desired color. It can be molded and extruded into an infinite variety of sizes and shapes. Write for more information about Tenite to TENNESSEE EASTMAN CORPORATION (Subsidiary of Eastman Kodak Company), KINGSPORT, TENNESSEE.

beautifully practical

→ Brace manufactured by Millers Falls Co., Greenfield, Mass. Tenite head and handle molded by F. J. Kirk Molding Co., Inc., Clinton, Mass.

TENITE

an Eastman Plastic

→ Information regarding Tenite is obtainable through representatives located in Chicago, Cleveland, Dayton, Detroit, Leominster (Mass.), Los Angeles, New York, Portland (Ore.), Rochester (N. Y.), St. Louis, San Francisco, and Seattle; and elsewhere throughout the world from Eastman Kodak Company affiliates and distributors.

Claremont Cotton Fillers provide the pattern and structure for stronger plastics. You don't see them in the finished products — they're the internal elements — their presence is one of function. They enable plastics to take on tougher and tougher end-use assignments. Complete details and laboratory testing samples of the four types of Claremont Cotton Fillers (flock, thread, fabric, cord) are available upon request. Inquiries invited!

a "Sof-Tee*" in name only... *materially speaking,* it's a TOUGHIE!

***"SOF-TEE"**

The newest taste in soda-fountain delicacies—and already popular with ice cream lovers—is Whipped Ice Cream. One element of the Sof-Tee machine which prepares such "Cup-cones" and "Walking Sundaes" in a matter of seconds, is the plastic canister shown here. Unit is product of Sof-Tee Corporation, Los Angeles, Calif.

This two-piece, 40 oz. capacity Mixing Canister is molded of American Cyanamid's MELMAC 3020 . . . compounded with sinewy, muscle-strong Claremont Macerated Fabric Filler.

The October issue of Plastics Industry has given the news value of this achievement quite a play . . . it's something to talk about!

And, since this precision-engineered piece has so completely satisfied material specifications, molding requirements and end-use performance, Claremont, as the supplier of its unseen but highly important strength factor, takes this opportunity to share the spotlight that is now being directed on this product's outstanding success.

CLAREMONT
·
FLOCK
THREAD
FABRIC
CORD

THE FILLER IS THE HEART

CLAREMONT
WASTE MANUFACTURING CO.
"The Country's Largest Manufacturer of Flock" CLAREMONT, N. H.

The Year 1949 in Review

THIS survey marks the completion of another decade of the manufacture of plastics. A similar review prepared in 1939 pointed out that 10 years previously, in 1929, the phenolic and pyroxylin materials were the alpha and omega of the industry. Then in rapid succession came the successful production and utilization of urea-formaldehyde compression-molding powders, cellulose acetate injection-molding materials, chemically-resistant vinyl resins, glass-clear acrylic and styrene resins, ethyl cellulose, and cellulose mixed esters. The molding sector of the industry was credited with the rapid perfection of the injection molding process and the development of fully automatic molding.

The 1939 review concluded with the following remarks: "What of the future as a new decade lies before us? The '40s of the last century stand out vividly as a period of industrial expansion in the history of our country and as the years marking the discovery of gold in 'them thar hills.' The potentialities inherent in the new plastics and in the improved tools that have been developed for fabricating them provide good reasons to believe that the '40s of this century will mark a golden decade for the plastics industry."

The record shows that this prediction has been eminently fulfilled. In annual production alone there has been a five-fold increase over the 250 million-pound figure of 1939. In new materials the '40s can boast of nylon resins, polyethylene, polyfluoroethylenes, unsaturated polyesters, melamine-formaldehyde resins, silicones, furans, saran, styrene copolymers, cellulose propionate, carboxymethylcellulose, hydroxyethylcellulose, and epoxy resins. Among the outstanding advances in molding and fabricating are electronic preheating, dry extrusion, blow molding, pulp molding, low pressure and contact molding and laminating, post forming of laminates, deep drawing of thermoplastics, and three-dimensional shaping of acrylic sheets.

What the '50s will bring is still to be revealed. Certainly the present emphasis on copolymerization as a means of obtaining a desired improvement in the property of a simple polymer will lead to a host of new commercial products; the trend to larger moldings and to the use of matched metal molds for

Pipes and fittings made of polyethylene for chemical plant use

production of low pressure laminated parts will bring about further advances in the application of plastics in semi-structural and structural members; and continuation of the present efforts devoted to the preparation and promulgation of recognized standards for plastic products and to informative labelling of articles sold in retail channels will further consumer acceptance of plastics as superior for many applications and result in extension of the markets for these modern materials of construction (1).[1]

Materials

The record of 1949 bears several references to a relatively new type of plastic, the epoxy resins, based on ethylene oxide or its homologs or derivatives. The earliest commercial product of this type is Carbowax, made by polymerization of ethylene oxide; it is a straight chain thermoplastic polymer. Compounds which have ethylene oxide groups at both ends are capable not only of chain formation but also of cross linking, thus leading to insoluble and infusible substances. Such compounds can be made by condensation of epichlorohydrin and bisphenol. The unmodified resins (Epon and Devran) can be cured by baking with suitable hardening agents or the resins can be esterified with fatty acids to produce varnish-type vehicles (2).

Another group of thermosetting epoxy resins is being supplied for use as adhesives, casting compounds, and surface coatings. The basic resin (Araldite) is a polyarylepoxyethane characterized by having chain molecules of aliphatic-aromatic structure with a reactive ethylene oxide group at each end. Hardening agents, such as metals, alkalies, organic bases, acid anhydrides, and compounds containing active hydrogen, cure these epoxy resins without the formation of volatile by-products. Very little shrinkage occurs during the curing process and excellent adhesion is obtained to metals and ceramics. The cured resins have good mechanical and dielectric properties and are resistant to common chemicals (3, 4).

Another innovation in the materials field during 1949 was the production of electrically conductive plastics. The properties of these compounds are comparable to the basic resins from which they are made except for electrical properties. By a compounding formula and process as yet undisclosed, substantial and predeterminable electrical conductivities are achieved. A broad variety of thermoplastic, thermosetting, and elastomeric materials have been made in the conducting form with mechanical, fabricating, and molding properties otherwise comparable to the ordinary plastics (5, 6).

Vinyls—The expanding market for vinyl resins was reflected in the unusually large number of articles published during 1949 concerning

*Reg. U. S. Patent Office.
[1] Numbers in parentheses link to "References" starting on page 265.

New applications of polyesters include this reinforced plastic bakery tray that is light in weight and easy to keep clean

this type of plastic. Outstanding among these was a group which described the effects of various compounding ingredients, including lubricants (7), stabilizers (7-9), coloring agents (7), and plasticizers (10-16), on the properties of the vinyl plastics. Information on the compounding (17) and application (18) of vinyl organosol and plastisol dispersions was also made available to the processors interested in this field. One manufacturer who converted from rubber latex to vinyl organosol coating reported twice as much production with half the personnel in one-tenth the plant area formerly needed.

Developments in the processing and application of vinyl film, sheeting, and coatings were reviewed in a series of five articles (19-22). Approximately 20 million yd. of vinyl film are being made in this country every month for uses customarily associated with fabrics, such as aprons, drapes, garment bags, and table covers. Fabricating operations involved in the converting of this film into the finished products include cutting, sewing, and electronic sealing, all of which are discussed in detail in the second (20) and third (21) articles of the series. The series is concluded with a description of methods and equipment employed in the application of vinyl coatings to fabric, including dip, knife, and roll coatings. A noteworthy advance in such equipment is the introduction of a compact radiant heater in which the heating elements are enclosed in glass fiber. Particularly applicable for plastisols and organosols, it is reported that these heating units will dry, fuse, and emboss a coated fabric in one-eighth the time required by a conventional coater.

A survey of the vinyl film and sheeting market (23) revealed that consumption has jumped from 42 million lb. in 1946 to about 100 million lb. in 1949. The principal outlets for film (10 mil or less in thickness) are household uses, wearing apparel (24), air inflatable items (25), and food packaging (26); those for sheeting are handbags, upholstery, luggage, shoes, bookbinding, and wall covering. The machinery, inks, and techniques employed in printing on vinyl film were reviewed by an outstanding authority on the subject (27).

The fund of information on vinyl polymers was increased by new contributions pertaining to polyvinyl isobutyl ethers (28, 29), polyvinyl carbazole (30), poly-1-vinylpyrene (31), polyvinyl chloroacetate (32), copolymers of vinyl compounds and maleic anhydride (33), and ternary polymers of vinyl compounds vinylidene chloride, and butadiene (34).

Ethylene Polymers—Liners for steel and fiber shipping containers are being made of extruded polyethylene film, which provides a chemically-resistant and inert packaging material, saves on shipping costs, and eliminates cleaning of drums. Pipes and fittings made of polyethylene for use in chemical plants are insoluble in all common solvents at temperatures up to 50 to 60° C., but are attacked by chlorinated solvents and aliphatic and aromatic hydrocarbons at elevated temperatures. The threaded fittings are reported to withstand pressures up to 50 p.s.i. at normal temperatures without leakage (35). Equipment is available for hot-melt spraying of polyethylene; addition of 0.5% carbon black improves the adhesion of the coating to metals (36). Buckets and jugs (37) for holding corrosive liquids, a large aircraft battery container (38), and a self-bonding electrical tape (39) are among the recently described applications of polyethylene (40).

Polymonochlorotrifluoroethylene products are being produced under the trade name Fluorothene for use by the various Atomic Energy Commission installations and other government agencies. Among the standard items which are being molded by compression, injection, and extrusion molding are sheets, rods, tubes, flare fittings, and laboratory ware (41). Tests have shown that the material is resistant to inorganic chemicals, except molten alkali metals, and to concentrated solutions of acids and alkalies. Organic solvents may swell the material, but do not dissolve it (42). Available commercially under the trade name Kel-F, this polymer was originally developed during World War II as a gasket and valve seat material for use in fluorine atmospheres; in the form of tubing 1 to 10 mils in thickness, it provides a protective liner or fuel bag for such highly corrosive materials as white fuming nitric acid and hydrogen peroxide.

Packings of polytetrafluoroethylene (Teflon) in braided form on spools or in rings are being marketed for packing valves, centrifugal and rotary shafts, and reciprocating rods. The packings are not affected by any solvents, acids, or caustic solutions at temperatures up to 690° F. Their non-adhesive property prevents excessive wear of reciprocating rods, shafts, and valve stems (43,44). Other fluorinated derivatives of ethylene under investigation include vinyl fluoride (45), vinylidene fluoride (46), and dichlorodifluoroethylene (46).

Styrene Resins—A styrene-base copolymer thermoplastic molding material with an impact strength in the high cellulosic range was introduced in May 1949 under the name Plexene TA. Its resistance to battery acids and gasoline and its dimensional stability make it suitable for battery cases and parts, tote boxes, freezer lids, and general industrial applications (47).

Another styrene-base plastic (Royalite) is currently available in flat sheets in standard colors and several grades of hardness and flexibility. Its composition includes butadiene-styrene and butadiene-acrylonitrile synthetic rubbers,

acrylonitrile, and styrene. Extremely tough and resistant to impact and abrasion, the material may be sawed, sheared, drilled, punched, sewed, cemented, and formed at 280 to 300° F. by the same techniques used for acrylic sheets. Applications include luggage, portable radio housings, truck fender guards, mixing bowls, bowling alley posts, and other large formed parts (48). Other developments in styrene copolymers were reported (49) and reviewed (50).

Acrylics—Reaction of transparent acrylic sheets with metal salts was reported to improve their resistance to abrasion, heat, and solvents (51). Polymerization techniques for acrylic resins were discussed (52, 53). The preparation and properties of a copolymer of methyl methacrylate with maleic anhydride were described (54). An investigation was conducted to determine the effects of various plasticizers on the brittle point of Lactoprene EV, a copolymer of 95 parts of ethyl acrylate and 5 parts of chloroethyl vinyl ether (55).

Silcones—New polymers of the silicone type described in the literature included vinyl and allyl derivatives (56, 57). Silicone resins are available as 50 to 60% solutions for formulating heat-stable coatings. These silicone finishes have excellent weather and moisture resistance as indicated by freedom from yellowing, chalking, and checking. Modified silicone aluminum coatings are about 30% more expensive to apply than organic aluminum coatings, but they normally protect hot metal surfaces two to three times as long (58).

Nylon Resins—Nylon moldings are being widely used for cams, bearings, fastening devices, and other industrial mechanical parts, many of which are buried within operating mechanisms. This plastic is form-stable even above 400° F., although it becomes appreciably more flexible above this temperature. It does not become brittle at temperatures as low as —70° F., but it does increase in stiffness as the temperature is lowered (59, 60). The availability of nylon molding powders in a wide range of colors is expected to broaden the market for the material in consumer items (61). Modified polyamides are being studied in the laboratory (62, 63).

Phenolics—Commercial use of nitrile rubber-phenolic combinations is developing along three lines: 1) as adhesives, e.g., for attaching soles to footwear and brake linings to brake shoes; 2) as modified nitrile rubbers to improve tear and abrasion resistance; 3) as modified phenolic molding compounds to improve toughness and resistance to thermal shock (64, 65). Further data became available regarding the properties of phenolic compounds containing agricultural residues (66) and lignin concentrates (67). Other reports pertained to shock-resistant products (68), plaster-phenolic casting material (69), and an acetylene-phenolic derivative for rubber compounding (70).

Polyesters and Alkyds—New techniques, resins, catalysts (71), and fillers are resulting in new and lucrative markets for the low pressure laminated plastics. The use of matched metal dies in this field is increasing and is providing moldings with two good surfaces and decreased finishing costs. Glass mats and nonwoven cotton fillers (72) are providing strong reinforcing materials at a cost lower than that of the woven fabric types. Inert extenders, such as China clay, pulverized mica, and silica compounds, not only reduce costs, but also cut down on shrinkage and yield more opaque products (73). Important new items made with polyester resins include bread boxes, bakery trays, washing machine parts (74), mannequins (75), and electrical insulation (76, 77). The polyester

COURTESY MARSH WALL PRODUCTS, INC.

Plastics offer desirable properties for use alone or with other materials in wall coverings. Here Marlite panels — hardboard with a baked-on urea formaldehyde resin finish — are used on walls and also shelves, partitions, counters

COURTESY B. F. GOODRICH CHEMICAL CO.

Vinyl plastisols are being more and more widely applied. These lifelike dolls, painted and costumed, are flexible, unbreakable

molding compound introduced in 1948 has been widely accepted for molding electrical parts because of its dielectric strength, arc resistance, dimensional stability, heat resistance, and low water absorption. Small high speed presses have become available commercially to take advantage of the low pressure and fast curing characteristics of this molding material (78). A symposium on alkyd resins reviewed the theory, manufacture, and application of these materials in protective and decorative coatings (79-83).

Cellulosics and Natural Resins—Progress in the development and application of flame-resistant cellulose acetate plastic has led to its approval by the Underwriters' Laboratories in an increasing number of products, notably housings of small motors such as are used for shavers, drills, vibrators, and mixers (84). Properties of cellulose acetate, cellulose acetate butyrate, and 2-methyl cellulose were the subjects of other articles (85-88). The solubilities, compatibilities, and other properties of allyl carbohydrates were reported; these new polymers are of interest in the formulation of inks and coatings (89, 90). Zein, a protein extracted from corn, is finding new markets because of its ready dispersibility (91) and its versatility as a packaging material (92). The production of various resinous products from rosin was described (93).

Other Polymers—Among the new types of polymers investigated in various laboratories were polyphenyl (94), phenoxyacetylene (95), vinylhydroquinone (96, 97), butenediol esters (98), and copolymers of butadiene with furfural (99) and methyl isopropenyl ketone (100). Other reports pertained to developments in polyallyl phosphonate (101), urea and melamine resins (102, 103), hard rubbers (104, 105), a thermoplastic cold-molding compound (106), and raw material requirements of the plastics industry (107). Polymerization techniques (108-113), reactions (114-117), and equipment (118) were described by other authors.

Laminates—A bibliography of laminating procedures and practices covered resins, fillers, manufacturing, fabrication, applications, properties, and reviews (119). A recently marketed laminate has an aluminum core which enables it to qualify as a non-flammable decorative material for ships, trains, and airplanes; it is dimensionally stable under varying atmospheric conditions and can be readily formed or bent (120). The problem of electrostatic spray painting of laminated parts in an assembly including metallic parts has been solved by incorporating in the resin solution a material which has a positive electrical charge (121). Progress in honeycomb sandwich construction was reviewed (122).

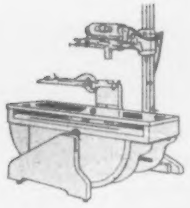
Resin-Wood Plastics—Structural boards made of wood waste bonded with 2 to 15% of synthetic resins by weight are in semi-commercial production, with a total output of more than 120,000 sq. ft. per day in four plants. Pilot plants are also in operation by 13 other lumber, plywood, millwork, and furniture companies. The boards are used for furniture, doors, wall covering, and construction sheathing. Three different types of processes are involved: 1) the dry process in which powdered phenolic or urea resins are mixed with dry wood waste; 2) the eastern wet process in which either a liquid resin or varnish is mixed with dry wood waste; and 3) the western wet process in which liquid phenolic resins are combined with wood waste in a wet slurry. All of them are based on molding the boards under heat and pressure in platen presses. The western wet process enables resin percentages in the board to be held at a low level (2 to 6%, generally) but requires the greatest investment in plant and marketing facilities (123). The British Artificial Resins board production is another dry-process operation, but is based on continuous-belt pressing (124). Another market for resin-bonded wood waste is being developed in the United States by a firm which is using this material to mold toilet seat cores, hamper tops, shoe last blanks, coat hangers, and decorative plaques (125).

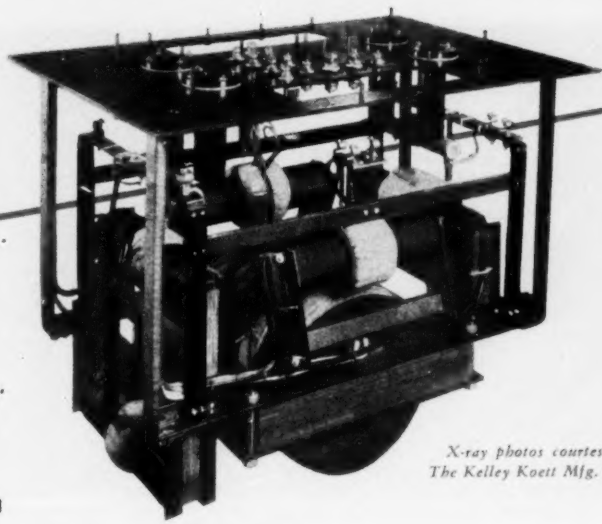
Plasticizers—Reviews of the production and uses of plasticizers emphasized the wide variety of types which are now available; these can be broadly classified into simple esters, polyesters, nitrile rubber, and petroleum derived extenders (126, 127). The statistics of the United States Tariff Commission reveal that about 147,509,000 lb. of the first type were produced in 1948. New plasticizers described during the past year include octyl and nonyl compounds based on alcohols made by the oxo process which was developed in Germany during World War II (128) and white mineral oils (129). Noteworthy contributions were made to the literature on the theoretical aspects of plasticizer action and the behavior of various resin-plasticizer systems (10-16, 55, 85, 86, 130-133).

Processing

The news of the year in the molding and fabricating of plastics was highlighted by the announcement of three different machines for compounding molding materials. Proprietary compounding of thermosetting materials has been common practice by consumer molders for many years. Now a similar trend is evident in the compounding and coloring of thermoplastics, aided and abetted by the formulation data made available by the materials and chemicals suppliers (7-17).

One of these machines is a double-worm compounder-extruder which will plasticize, compound, and color thermoplastic resins in continuous operation. The machine can also be





X-ray photos courtesy
The Kelley Koett Mfg. Co.

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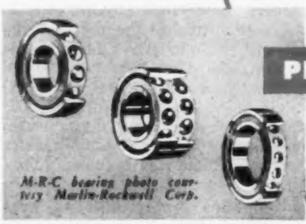
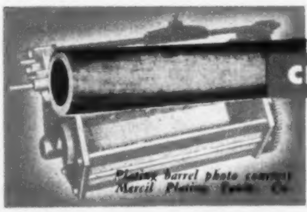


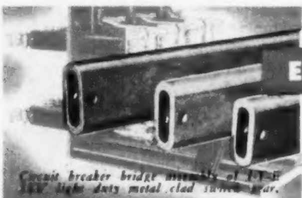
PHYSICAL

Ball bearing retainer rings for all industry call for Formica's superior physical properties.



CHEMICAL

Formica's excellent for electroplating barrels and other applications requiring high resistance to chemicals.



ELECTRICAL

Bus Bar insulation, one of many Formica applications in electrical fields.

The X-ray machine you see is but one example of Formica's incomparable quality at comparable cost. In this case, it's Formica Tubing, used for insulating the powerful 125,000-volt transformer.

Formica also comes in special molded shapes, rods and sheets (note frame supports in transformer above). It can be machined, punched, turned, milled, drilled, threaded, stamped and postformed. There's a variety of grades, each high in electrical, physical, or chemical properties, whichever is most desirable. There's a grade for your need, whatever it may be. Why not let ***our engineers*** work with ***your engineers?***

Send $1.00 — to Formica, 4531 Spring Grove Ave., Cincinnati 32, O. — for your own personal, numbered copy of Formica's "Data for Industry" . . . the most comprehensive book on laminated plastics properties ever produced.

Productive
FORMICA
at Work in Industry

COURTESY TENNESSEE EASTMAN CORP.

Plastic scale models are being widely used for advertising. This miniature Oldsmobile, 25 to 1 scale, is molded of cellulose acetate

set up as a pelletizer or as an extruder using conventional extrusion dies (134). Another two-worm compounder-extruder is capable of multiple-unit operation to produce different shapes of continuous or variable section in two or more colors or of incorporating two or more materials into the same piece. For example, a flexible hose is produced with a soft, gasoline-resistant, polyvinyl chloride inner lining and a mechanically-strong, spiral outer wall of rigid polyvinyl chloride with the two materials permanently fused together (135). The third compounding machine is a high speed, continuous, centrifugal-type mixer which serves to disperse evenly the ingredients of a molding compound. The particles are subjected to severe impact, first by the impactors mounted in the rotor and second by the walls of the housing; the thoroughly blended material is then discharged by gravity at the rate of 200 lb. per minute (136).

The economic factors in plastics extrusion were discussed in a series of three articles which emphasized the diversified markets in which these profiles are now found, namely: refrigerator breaker strips, fluorescent lighting, price ticket channeling, chemical pipe, medical tubing, garden hose, belts, straps, web furniture, insect screening, ropes, upholstery fabrics, and so on (137). Basic details of the manufacture of polyethylene film ranging from 0.0005 to 0.005 in. in thickness by both sheet- and inflated-tube extrusion methods were disclosed. This type of film is in demand for packaging vegetables, meats, poultry, plants, and similar mechandise because of inertness, non-toxicity, and low rate of moisture vapor transmission (138). Equipment and techniques for extruding unplasticized polyvinyl chloride were also described (139).

Another major development in molding equipment comprised a unit for the injection into a mold of extrusion-heated thermoplastics. The injection piston operates only against completely plasticized materials; hence injection pressures are low and capacity is high. The first machine is rated at 48 oz.; a 160-oz. unit is already being designed, indicating that much larger thermoplastic moldings may soon be on the market (140).

Some of the problems and advantages of pin point gating of injection molds were discussed (141). Improvements in techniques and machinery for production of acrylic lenses are expanding their use in the optical systems of cameras (142). Other contributions to the subject of injection molding were concerned with the design of machines (143) and of dies for molding nylon (144). The relatively quiescent sector of the injection field concerned with thermosetting materials was marked by the announcement of a new process which is reported to be particularly advantageous in the molding of thick sections or articles of greatly varying section (145).

The compression-molding field has moved into a new size range in big moldings, stimulated by the demand for plastic housings for television sets. One-piece phenolic console cabinets, which are 32 in. high, 16¾ in. wide, and 18 in. deep and weigh 35 lb., are now in production. They are turned out of an 8-ton mold in a 2000-ton capacity press at the rate of 10 cabinets per hour (146). These larger moldings have been made possible by improvements in press and preheating equipment and by the introduction of modified resins which permit lower pressures to be used in molding them. The plastic television cabinets have superior finish and durability, can be produced more rapidly, are easier to handle on the assembly line, and are actually less costly than wood or metal cabinets. Other applications in which larger pieces are being molded include textile machinery, industrial truck wheels, electrical parts, and furniture (147).

The television field is also responsible for an innovation in compression techniques, involving integral plunger molding of a tube support in which a moving part in the mold furnishes the pressure required for the long flow of the plastic after the mold has closed (148). A process for embedment of objects in clear acrylic for decorative and display purposes by compression molding instead of the much slower casting method was revealed (149). Other authors dealt with preforming and molding problems (150), preheating electronically (151), and with hot air (152), and the evolution of molding presses (153).

Developments in alloys for molds included an improved steel for hobbing and subsequent machining (154) and beryllium copper for casting by regular foundry methods, including pressure, sand, and investment techniques (155). The factors which need to be considered in order to keep mold costs to a minimum were summarized for the layman customer (156). Testing of injection molds and remedies for common faults were discussed (157). The need for cooperation between the materials supplier, molder, and product engineer in improving the design of plastic parts was stressed in an analysis of molding and application difficulties (158).

Complete directions for the preservation of agricultural and other materials in plastics were published; the methods described included impregnation and coating with cellulose acetate or vinyl resins and embedment in cast acrylic (159). Improved methods of casting (160, 161), finishing (162, 163), beading (164),

LONG ISLAND CITY JAN 18 1950 N.Y.P.

COURTESY THE PLASWOOD CORP.

Construction sheathing boards are being made up of waste wood particles plus a specified resin content. They handle like wood

welding (165), and plating (166-169) plastics were reported and reviewed.

Applications

The tremendous increase in the volume of production of plastics in the United States during the past decade has been accompanied by a remarkable diversification of end uses of these materials in commerce and industry. Illustrative of the range of products now made in plastics are the reports concerning mass production of boats (170), unbreakable squeeze bottles (171, 172), buttons (173), camera parts (142, 174-176), casket vaults (177), electrical insulation (178, 179), fans (180), fishing accessories (181), foundry matchplates (182), goggles (183), irrigation hose (184), radios and television sets (146, 147, 185, 186), refrigerator parts and accessories (187, 188), shavers (189), shoes (190, 191), signs (192), sound recordings (193), toys and ornaments (194, 195), upholstery (196), and vacuum cleaners (197).

The automotive industry continues to be a large consumer of plastic products (198). New developments were reported concerning parking and tail light lenses (199), transparent cowl covers (200), folding windows for convertibles (201), window screens (202), emergency lamps (203), laminates for body construction in station wagons (204) and trailers (205), and brake linings (206). Polystyrene, cellulose acetate, and rubber were used in an 8-part bicycle horn assembly (207). In the aircraft field an outstanding application is the 9½-lb. polystyrene storage battery case, produced by the "canned material" transfer process (208). Plastic sleeves are available for attachment to the many cables and tubes in a modern airplane for identification purposes (209).

Advances in new plastic materials and fabrication methods are especially prevalent in the building construction and decoration field, which holds great promise of being a major factor in the future expansion of the plastics industry. The multi-million dollar wall covering market is being invaded by synthetic resins in combination with wood, paper, cloth, hardboards, asbestos, and other products, as well as in the form of woven monofilaments and unsupported sheeting. Thus far, these plastic wall coverings have had wider usage in commercial and industrial structures than in private homes. Their almost limitless color range, freedom from staining, and ease of cleaning meet the modern decorating requirements for offices, retail stores, hotels, waiting rooms, restaurants, bars, club cars, and steamship lounges (210, 211). Acrylic lighting panels and vinyl flooring serve equally for beauty and durability in a new luxury hotel (212). In a hardier environment, acrylic sheets and polyester glass mat laminates have proved to be economically feasible for installation as skylights and glazing in factory buildings (213). Current actvities in the production of synthetic lumber and sheathing from wood wastes and resin binders have already been mentioned (123).

A survey of recent developments and new information on the use of plastics as chemical engineering materials of construction reveals marked progress in this field. Polymonochlorotrifluoroethylene is being used for gaskets and valve seats in high vacuum and pressure systems handling corrosive chemicals, valve bodies, diaphragms, bearings, pump seals, sight glasses, and manometers. Furan resins are serving as protective coatings over wood, masonry, and metal in chemical plants and as a resinous mortar in installing brick or tile for floors, pits, sewers, vats, walls, and flues, designed to cope with conditions encountered in battery plants, dairies, dye plants, food processing, oil refineries, ordnance works, pickling houses, pulp and paper mills, rayon plants, soap factories, and steel processing mills. Industrial gloves made of polyvinyl chloride paste and a fabric base have 5 to 20 times the life of those made with leather, moleskin, or rubber in handling various chemicals. A wide variety of other plastics are functioning as protective coatings and linings in chemical plants (214).

In the packaging machinery field, there has been an increasing use of plastics for both structural and functional purposes. In a bottling machine a rotary star wheel made of phenolic laminate has reduced breakage 40% and permitted a 30% increase in speed of operation. The problem of corrosion by salt and fats has been met in weighing and packaging potato chips by the use of acrylic plastic parts; in the new machine the potato chips do not come in contact with any material other than acrylic plastic from the time they leave the storage hopper until they reach the bag (215).

Other reported applications of plastics involving resistance to chemicals pertained to film-developing tanks and siphons made of cellulose acetate butyrate, ethyl cellulose, and polystyrene (216, 217), an acrylic etching machine replacing stoneware equipment in photoengraving shops (218), dispensing valves made of polystyrene, polyethylene, and nylon parts (219, 220), polyvinyl chloride protective clothing (221), and phenolic parts for textile machinery (222).

The preparation (223), operation (224-227), and utilization (228) of ion exchange resin systems continued to receive the attention of numerous investigators, indicative of the significance of this new industrial tool in chemical engineering and water purification.

An unusual exception to the rule of mass production in plastic molding is the use of compression molding to produce acrylic artificial eyes according to prescription. Sizes and shapes have been standardized into 50 types and colors into approximately 100 combinations (229). Other recent medical applications of plastics include a nylon cervical radium applicator for cancer treat-

(Continued on page 262)

PLASTICS DIGEST*

Abstracts from the world's literature of interest to those who make or use plastics or plastics products. Send requests for periodicals to the publishers listed.

General

JAPAN'S PLASTICS INDUSTRY. Brit. Plastics *21*, 545 (Oct. 1949). Statistics on the plastics industry in Japan are presented and discussed. Japan exports plastics, particularly cellulose nitrate, to the U. S. A.

PLASTICS. G. M. Kline. Ind. Eng. Chem. *41*, 2132-37 (Oct. 1949). Advances during the past year in the use of plastics as chemical engineering materials of construction are reviewed. 109 references.

FIBERS. R. S. Casey and C. S. Grove, Jr. Ind. Eng. Chem. *41*, 2119-21 (Oct. 1949). Advances during the past year in the field of fibers are reviewed. 107 references.

ELASTOMERS. H. L. Fisher. Ind. Eng. Chem. *41*, 2115-19 (Oct. 1949). Advances during the last year in the field of elastomers are reviewed. 93 references.

Materials

PLASTICS CAN BE ELECTRICAL CONDUCTORS. Electrical Manuf. *44*, 60-3, 170, 172, 174, 176, 178, 180 (Nov. 1949). The properties of electrically conductive plastics are described and comparison with those of commercial grades is made. The properties are comparable except for electrical properties. These new materials have substantial and predeterminable electrical conductivities, have mechanical, fabrication and molding properties comparable to that of ordinary plastics, and can be made in a broad variety of thermosetting, thermoplastic, and elastomeric formulations.

ZEIN: VERSATILE PACKAGING RESIN. Modern Packaging *22*, 122-5, 154, 156 (Aug. 1949). The properties of zein, a resin derived from corn, are described. The properties indicate uses in adhesives and coatings.

LOW-TEMPERATURE POLYMERIZATION. W. S. Penn. Plastics (London) *13*, 378-87 (July 1949). The low-temperature polymerization of monomers to make high polymers is reviewed. The polymerizations of styrene, isobutylene, methyl styrene, and butadiene with styrene are discussed. 39 references.

NEW TORCH LICKS PROBLEM OF FLAME-SPRAYING POLYTHENE. W. B. De Long and E. V. Peterson. Chem. Engineering *56*, 123-5 (June 1949). A gun for hot-melt spraying coatings of polyethylenes and the application technique are described in detail. The addition of 0.5 percent carbon black or graphite improves the adhesion to metals. The sprayed polyethylene is not degraded, retains its mechanical properties, forms a continuous film, and is not reduced in resistance to chemicals.

POLYMERIZATION OF ALLYLCELLULOSE. S. N. Danilov and O. P. Koz'mina. Zhur. Obshchei Khim. *18*, 1823-32 (1948); Chem. Abstracts 43, 5943-4 (Aug. 10, 1949). The preparation of allylcellulose is described. The product containing 1.7 to 1.8 allyl groups per glucose unit is soluble in acetone, that containing 2.2 groups is soluble in ethanol. These products can be cross linked by heat, exposure to ultra-violet radiant energy, and benzoyl peroxide. They can be chlorinated also.

ACRYLIC RESINS. I. C. T. Kautter. British Plastics *21*, 332-9, 390-6 (June, July 1948). The methods of production and fabrication of transparent acrylic plastic sheet are reviewed. Polymerization techniques are described in detail.

PREPARATION AND PROPERTIES OF ALLYLSUCROSE. Ind. Eng. Chem. *41*, 1697-1700 (Aug. 1949). Allylsucrose can be prepared with allyl chloride. Allylsucrose can be stored for long periods. The resistance to weathering of the polymerized material is good. Polymers and copolymers with acrylic and methacrylic esters are described.

COMPATIBILITY, EFFICIENCY AND PERMANENCE OF PLASTICIZERS. R. F. Boyer. J. Applied Phys. *20*, 540-52 (June 1949). Attempts are made to interrelate three important aspects of plasticizer behavior: compatibility, or how much plasticizer can be added without causing phase separation; efficiency, or how much a given amount of plasticizer lowers the brittle temperature; and permanence, or how well a plasticizer is retained by the polymer on heat aging or solvent treatment. Compatibility is discussed in terms of the Flory-Huggins theory of the thermodynamics of polymer solutions, which relates the activity of the plasticizer to its concentration in the polymer. Efficiency is measured by how the plasticizer lowers the melt viscosity of the polymer. An empirical relationship between efficiency and the Huggins polymer-solvent interaction constant is shown. Loss of plasticizer at elevated temperatures depends in part on the effective vapor pressure of the plasticizer, and in part on how rapidly diffusion of plasticizer from the interior of the sample replenishes that lost from the surface. From the fact that diffusion constant times viscosity is a constant, it is possible to correlate measured diffusion rates with plasticizer content and with plasticizer efficiency. A linear relationship is predicted and found experimentally between logarithm of the diffusion constant and the brittle temperature. In this sense, the more efficient a plasticizer is, the more rapidly it can diffuse out of the polymer and be lost. Consideration is given to the effect of plasticizer on electrical resistance and tensile strength. A preliminary discussion of polymeric plasticers is presented.

Applications

COLOR REMOVAL IN SUGAR LIQUORS BY SYNTHETIC RESINS. I. M. Abrams and B. N. Dickinson. Ind. Eng. Chem. *41*, 2521-3 (Nov. 1949). Ion exchange treatment of industrial sugar liquors is always accompanied by decolorization. Experience has shown that color removal is more effective on the anion than on the resinous-type cation exchanger. Considerable circumstantial evidence indicates that de-colorization and de-ionization are frequently independent of each other. Concurrent pH and color-removal curves obtained with two types of anion exchange resins and with both a beet sugar liquor and a corn sugar liquor serve to illustrate both a parallelism and a lack of correlation between the two phenomena. A new type of adsorptive resin which effectively removes color without influencing pH is described.

PHENOLICS IN THE TEXTILE INDUSTRY. Brit. Plastics *21*, 526-34 (Oct. 1949). A description of components

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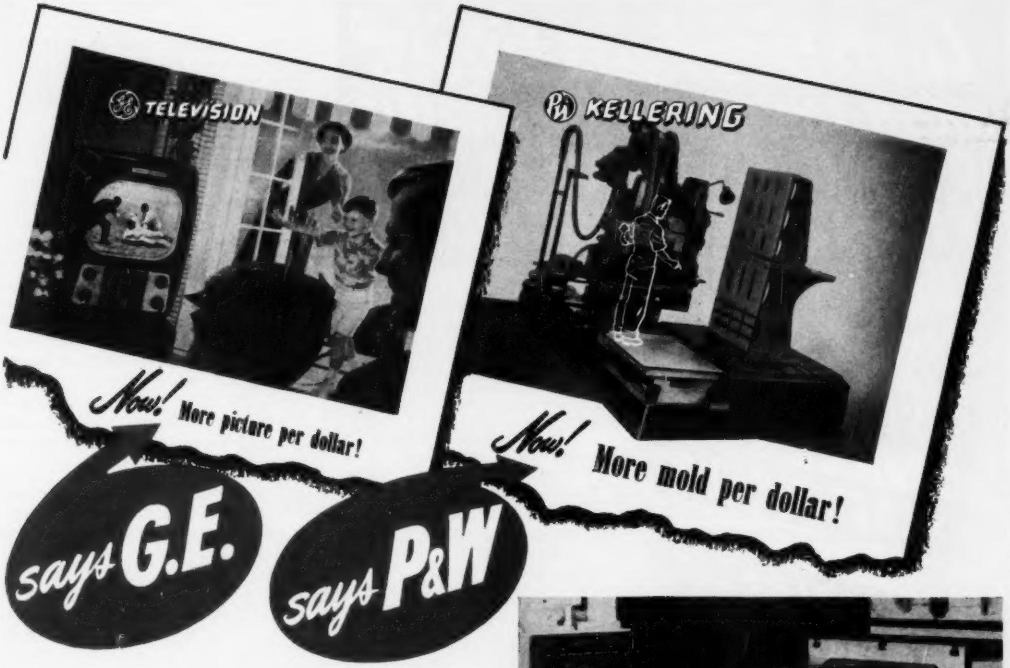
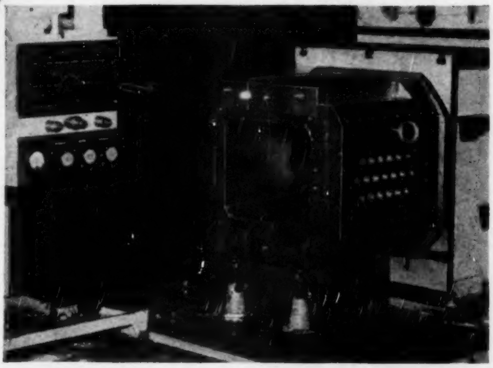
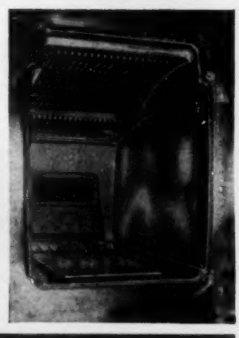


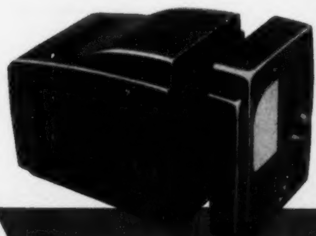
Pratt & Whitney *Kellering* translates General Electric's design-ideas into the smart, sturdy cabinets that house their good-looking TV Sets. The intricate plastic molds that form these cabinets are duplicated accurately from models on the type BG-1 Keller Machine pictured above.

Kellering is heavy-duty, tracer-controlled milling — the most modern, efficient, economical way to accurately and automatically produce dies and molds from wooden or cast models. P&W makes the Keller in all types and sizes for 2-dimensional and 3-dimensional work. It will pay you well to look into *Kellering.* May we send you descriptive Bulletins?



Top: Mold for TV Cabinet set up on the Keller BG-1.
Right: An indication of the precision required by G.E.'s die and mold shop.
Below: Plastic Cabinet for G-E Model 805 TV Set.





Pratt & Whitney

Division Niles-Bement-Pond Company
WEST HARTFORD 1, CONNECTICUT

Keller Machines

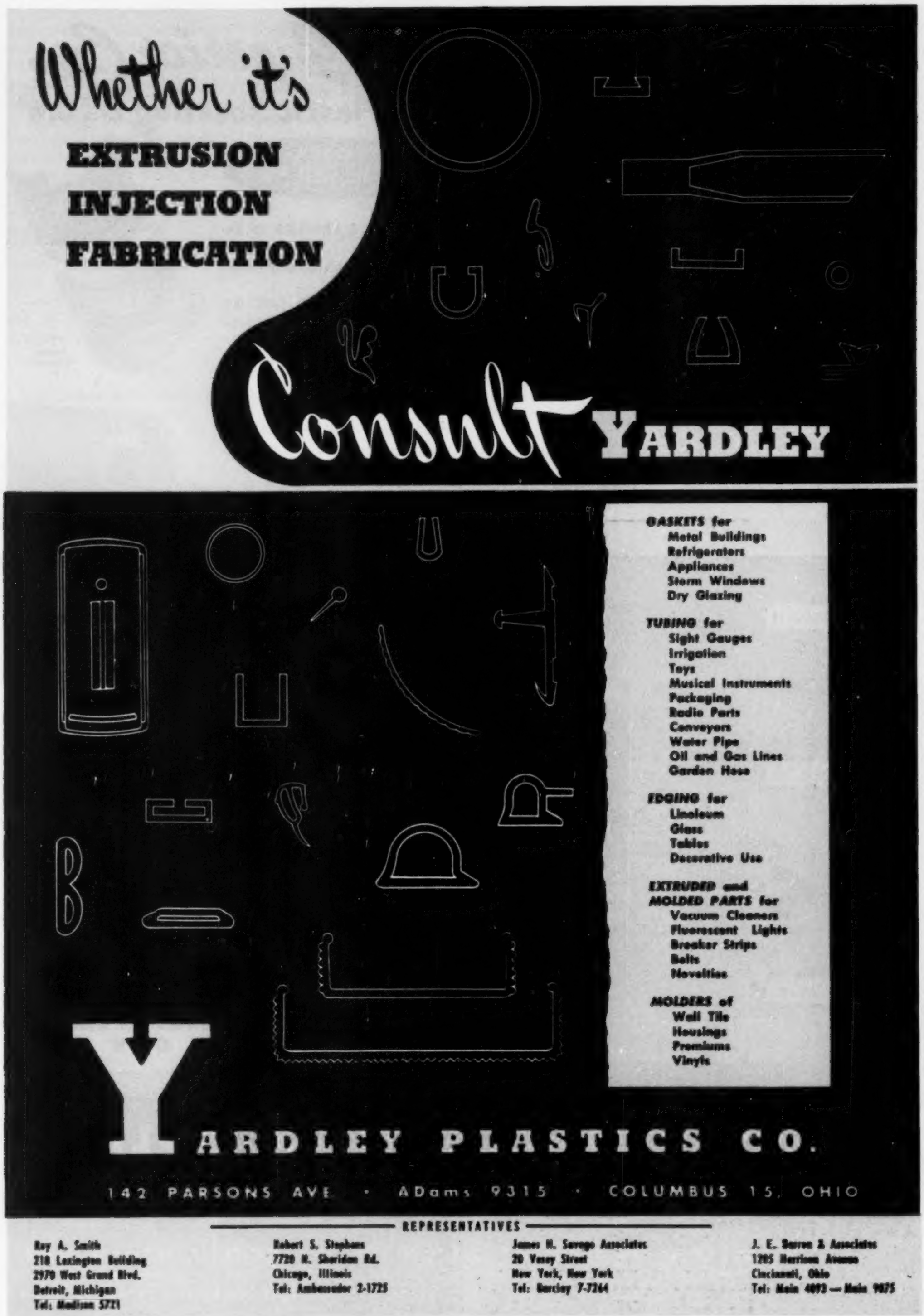
of textile machinery molded of phenolic plastics is presented. These include bobbins, frames, pulleys, cone mandrels, reels, spinning boxes, brackets, rollers, switch boxes drive parts, and warp beams.

Properties

Mechanical Properties of Polystyrene Films Cast From Solvents. E. Merz, L. Nielsen, and R. Buchdahl. J. Polymer Sci. *4*, 605-17 (Oct. 1949). The variables of casting polystyrene film from methyl ethyl ketone and from benzene were investigated. It is shown that stringent drying is necessary to remove the last traces of solvent. The differences in dry film structure, second-order transition point, and temperature at which the dynamic modulus suddenly decreases are considered in the discussion.

Pyrolysis of Polyisobutene (Vistanex), Polyisoprene, Polybutadiene, GR-S, and Polyethylene in a High Vacuum. S. L. Madorsky, S. Straus, D. Thompson, and L. Williamson. J. Polymer Sci. *4*, 639-64 (Oct. 1949). Samples of polyisobutene, polyisoprene, polybutadiene, GR-S, and polyethylene, weighing about 25 to 50 mg., were pyrolyzed in a vacuum of about 10^{-6} mm. of mercury in a specially designed apparatus at temperatures ranging between 300 to 475°C. The volatile products of pyrolysis were separated into four fractions: (IV) gaseous, volatile at —196°; (IIIA) liquid, at —75°; (IIIB) liquid, at 25°; and (II) waxlike fraction, volatile at the temperature of pyrolysis. The gaseous fraction was analyzed in the mass spectrometer and was found to consist in all cases of methane. The liquid fraction, IIIA, was analyzed similarly and was found to give a mass spectrum characteristic for any given polymer. A molecular weight determination of the waxlike fraction by the micro freezing point-lowering method, showed it to vary from 543 to 739, depending on the polymer from which the fraction was obtained. It is shown that the method of pyrolytic fractionation of high molecular weight polymers, in conjunction with mass spectrometer analysis of the more volatile fractions, can serve as a means of identifying the poiymers.

Equation of State for Polystyrene. R. S. Spencer and G. D. Gilmore. J. Applied Phys. *20*, 502-6 (June 1949). Practical considerations emphasize the desirability of formulating an adequate equation of state for polystyrene. A fairly satis-


Whether it's
EXTRUSION
INJECTION
FABRICATION
Consult YARDLEY
GASKETS for
Metal Buildings
Refrigerators
Appliances
Storm Windows
Dry Glazing
TUBING for
Sight Gauges
Irrigation
Toys
Musical Instruments
Packaging
Radio Parts
Conveyors
Water Pipe
Oil and Gas Lines
Garden Hose
EDGING for
Linoleum
Glass
Tables
Decorative Use
EXTRUDED and
MOLDED PARTS for
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Fluorescent Lights
Breaker Strips
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factory one is this simplified version of van der Waals' equation, $(P + \pi)(V - \omega) = nRT$, where π is the internal pressure (or cohesive energy density) and ω is the volume at absolute zero, by extrapolation. Evaluating constants from thermal expansion data and expressing P in p.s.i., V in cc per gram, and T in degrees Kelvin, this becomes $(P\ 27{,}000)(V - 0.822) = 11.6T$. Agreement with compressibility measurements, which are described in some detail, is good. Discrepancies with room temperature values of sound velocity and cohesive energy density by swelling measurements are discussed briefly.

Testing

New Corrosion Test for Plastics. W. H. Adams and H. H. Lebach. Chem. Engineering *56*, 98-101 (July 1949). A method of test is described for determining the effect of chemicals on plastics. The immersions are made in sealed tubes. Ratings are obtained from tables based on appearance of solution, appearnce of sample, change in weight, and change in specific gravity. Data are presented which show a good degree of correlation with field experience.

Cap Torque Tester. F. G. Pellett. Modern Packaging *22*, 130 (Sept. 1949). A device for measuring the torque required to close, remove, or break a bottle cap is described.

Diphenylamine Test for Nitrates in Mixtures of Cellulose Esters. A. G. Roberts. Analytical Chem. *21*, 813-15 (July 1949). Diphenylamine in sulfuric acid is a sensitive reagent for indicating nitrates by producing a blue coloration. Earlier investigations were limited to nitrate in very dilute aqueous solution. Uncertainty exists concerning its use in higher nitrate range and upon solid materials. An investigation was made of the speed and strength of color development when solutions containing diphenylamine and water were brought into contact with films cast from mixtures of cellulose esters covering a wide range of nitrate compositions. The color development time is a minimum in the region of 2 to 6% nitrogen and increases at higher and lower concentrations. Water content is important; diphenylamine concentration exerts a minor influence. A suitable reagent for general use over a wide nitrate range contains 0.1 gram of diphenylamine, 100 ml. of concentrated sulfuric acid, and 30 ml. of water. Quantitative estimates are possible when films of known nitrate composition are used for comparison.

U. S. PLASTICS PATENTS

Copies of these patents are available from the U. S. Patent Office, Washington, D. C., at 25¢ each.

COPOLYMERS. W. H. Wood (to Du Pont). U. S. 2,479,146, Aug. 16. A copolymer of vinyl acetate and 1,3-dioxolane.

POLYMERIZATION. R. S. George (to Hercules). U. S. 2,479,226, Aug. 16. Emulsion polymerizing a vinyl compound in the presence of a peroxide catalyst and an alkali salt of dehydrogenated tall-oil.

POLYMERIZATION. E. C. H. Kolvoort and G. Akkerman (to Shell Development). U. S. 2,479,241, Aug. 16. Emulsion polymerization of a vinyl compound.

RESIN MODIFIER. O. W. Schroeder (to W. E. Beatty and B. A. Milnar). U. S. 2,479,270, Aug. 16. Utilizing raw citrus pulp, raw pineapple pulp, leaves, or hulls by comminuting with liquid phenol-formaldehyde resin.

WRINKLE COATING. N. T. Beynon (to New Wrinkle). U. S. 2,479,298, Aug. 16. Wrinkle coating comprising conjugated double-bonded oil and polyvinyl acetate resin in aqueous emulsion.

COPOLYMERS. T. L. Cairns, A. W. Larchar, and B. C. McKusick (to Du Pont). U. S. 2,479,306, Aug. 16. Copolymers prepared by heating styrene and furan or monoalkyl furan under pressure.

INTERPOLYMERS. R. M. Joyce, Jr. and J. C. Sauer (to Du Pont). U. S. 2,479,367, Aug. 16. Subjecting a mixture of tetrafluoroethylene and ethylene to heat in the presence of an inorganic peracid salt.

ORGANO-SILICON COMPOUND. R. H. Krieble (to G. E.). U. S. 2,479,374, Aug. 16. Heating vinyl-silicon compounds in the presence of a peroxy catalyst.

COATING. M. J. Roedel (to Du Pont). U. S. 2,479,409, Aug. 16. Metal containers coated with a copolymer of vinyl chloride and dimethyl fumarate mixed with a phenol-formaldehyde resin.

MOLDING. W. R. Tucker (to H-P-M Development). U. S. 2,479,433, Aug. 16. A portable molding machine.

TRIPOLYMERS. D. W. Young and W. J. Sparks (to Standard Oil Development). U. S. 2,479,450, Aug. 16. Reacting isobutylene, a multi-olefin, and a chlorinated styrene in the presence of a Friedel-Crafts catalyst.

SHAPED ARTICLES. J. H. Young (to Du Pont). U. S. 2,479,451, Aug. 16. Catalyst comprising molded pellets of polytetrafluoroethylene mixed with a finely divided solid material.

RESIN. J. R. Dudley (to American Cyanamid). U. S. 2,479,480, Aug. 16. A resinous cationic surface-active material obtained by condensing a saturated fatty acid with a water-soluble themoplastic amine resin.

COPOLYMER. H. L. Gerhart (to Pittsburgh Plate Glass). U. S. 2,479,486, Aug. 16. A copolymer of styrene, an unsaturated dicarboxylic acid, and a polyester of a glycol or ether and endomethylene delta-4-tetrahydrophthalic anhydride.

LIGHT TRANSMISSION. M. Marks. U. S. 2,479,501, Aug. 16. A film of polyvinyl acetaldehyde containing a cupric salt and ethyl silicate.

ROSIN ESTERS. J. B. Rust and W. B. Canfield (to Montclair Research and Ellis-Foster). U. S. 2,479,516, Aug. 16. Heating rosin with a polymer of a vinyl compound.

COPOLYMER. F. Strain (to Pittsburgh Plate Glass). U. S. 2,479,522, Aug. 16. A resinous copolymer of maleic anhydride and a polycarboxylic acid ester.

POLYMERIZATION. A. B. Hersberger and R. G. Heiligmann (to Atlantic Refining). U. S. 2,479,618, Aug. 23. Low-temperature polymerization of α-alkyl styrenes in carbon disulfide solution in the presence of Friedel-Crafts catalyst.

PHENOLIC RESINS. G. A. Senior, Jr. (to Bakelite). U. S. 2,479,643, Aug. 23. Reacting an aldehyde and a phenol in the presence of a sulfonic acid.

EXTRUDING. J. Bailey and R. W. Canfield (to Plax). U. S. 2,479,804, Aug. 23. Method and apparatus for extruding plastic material.

VINYL RESINS. J. K. Fincke and E. W. Gluesenkamp (to Monsanto). U. S. 2,479,918, Aug. 23. Vinyl chloride resin stabilized with tetra-α-thienyl tin.

OPTICAL ELEMENTS. J. Johnson (to Combined Optical Industries). U. S. 2,479,935, Aug. 23. An optical body comprising a transparent synthetic resin coated with another synthetic resin.

VINYL FLUORIDE. A. E. Newkirk (to G. E.). U. S. 2,479,957, Aug. 23. Polyvinyl fluoride prepared by polymerizing monomer in solution in the presence of a peroxy catalyst.

TESTING APPARATUS. C. R. Stock (to American Cyanamid). U. S. 2,479,984, Aug. 23. Apparatus for measuring distortion temperature of plastic materials.

CHLORINATED POLYETHYLENE. D. A. Fletcher and A. W. Anderson (to Du Pont). U. S. 2,480,007-9, Aug. 23. Treating soluble chlorinated polythene with an iron salt or an oxide of lead and a peroxy compound, or carbon black.

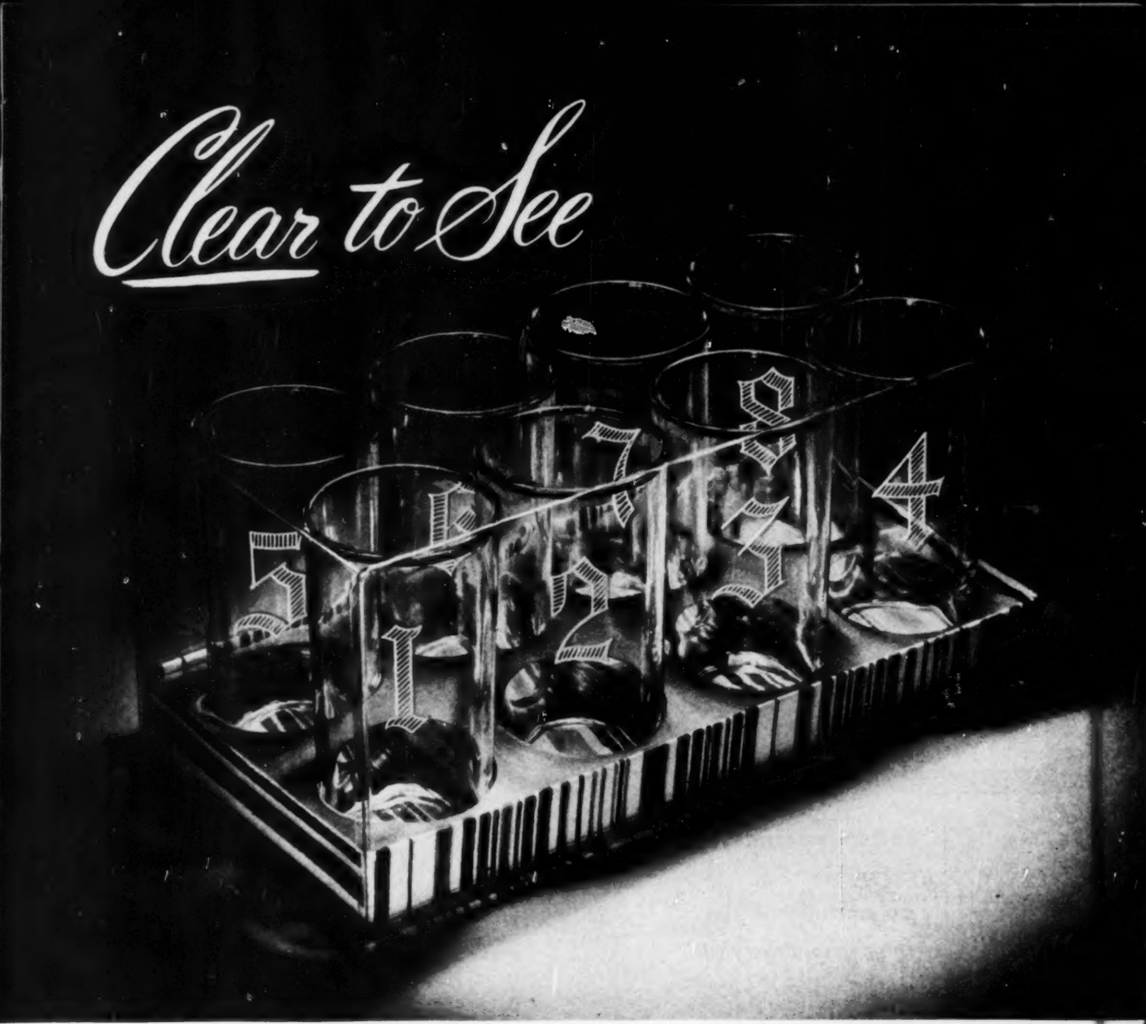
BUTTON. F. G. Purinton (to Patent Button). U. S. 2,480,262, Aug. 30. A molded plastic button.

ADHESIVE. R. E. Kent and A. Stockfleth (to Du Pont). U. S. 2,480,295, Aug. 30. Adhesive comprising a mixture of polythene, ammonium sulfamate, and chlorinated paraffin.

COMPOSITION. R. E. Burk (to Du Pont). U. S. 2,480,296, Aug. 30. Polymer of polythene and halogenated polythene modified with a condensate of phosphorus pentasulfide and an alcohol, amine, or mercaptan.

POLYTHENE. R. M. Goldrick and B. M. Marks (to Du Pont). U. S. 2,480,297, Aug. 30. Solid polythene having a sulfide of phosphorus distributed therein and heated to 300° F.

FLAME RETARDANT. W. B. Happoldt, Jr. (to Du Pont). U. S. 2,480,298, Aug. 30. Solid Polythene, antimony



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If you wish further information about Kodapak Sheet, its fabrication, and end uses, consult your nearest representative, or write Kodak. If your problem is particularly complicated, a day or two in the Kodapak Demonstration Laboratory in Rochester will prove helpful.

Cellulose Products Division, Eastman Kodak Company, Rochester 4, N. Y. Sales offices in New York, Chicago. District sales representatives in Cleveland, Philadelphia, Providence. Pacific Coast distributor: Wilson & Geo. Meyer & Co., San Francisco, Los Angeles, Portland, Seattle. Canadian distributor: Paper Sales, Limited, Toronto, Montreal.

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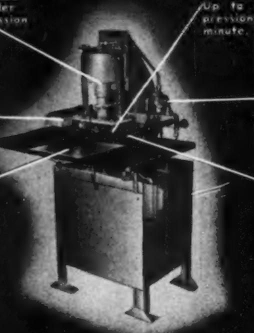

Because it operates by compressed air power, it delivers a "cushioned impression" that eliminates breakage of the items being stamped.

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Silverware has traditionally been sold in wooden chests. But when International Silver—world's largest silverware maker—offered a "completing set" of 24 odd pieces to supplement the basic set, they adopted this Kirk-molded, clear plastic chest. Elegance is preserved—eye appeal, economy, and protective features added. Sales?—*better than most optimistic predictions.*

Write us if our ability to mold "merchandising magic" into plastic containers fits into your plans.

F. J. KIRK MOLDING Co.
CLINTON, MASS.

tri-oxide, and a chlorinated hydrocarbon.

Molding Machine. R. M. Alden. U. S. 2,480,313, Aug. 30. A plastic molding machine.

Coating. A. E. Young and H. M. Hoogsteen (to Dow). U. S. 2,480,349, Aug. 30. A coating mixture of ethyl cellulose, a urea, melamine, or urea-melamine resin, and 4,4'-isopropylidene-bis(1-phenoxy-2-propanol).

Resins. J. K. Simons (to L-O-F). U. S. 2,480,514, Aug. 30. Reaction product of formaldehyde, dicyandiamide, and a hydrazide.

Interpolymer. D. D. Coffman and H. W. Jacobson (to Du Pont). U. S. 2,480,551, Aug. 30. A heat-hardenable completely hydrolyzed interpolymer of ethylene, vinyl acetate, and diethyl fumarate.

Sign. W. L. Kohlhauer and W. R. Bird. U. S. 2,480,584, Aug. 30. A luminous, luminescent plastic sign.

Polyethylene. D. E. Strain and W. V. Osgood (to Du Pont). U. S. 2,480,615, Aug. 30. Forcing heated solid Polythene through a small orifice forming a workable mass.

Siloxane Elastomer. E. L. Warrick (to Corning Glass). U. S. 2,480,620, Aug. 30. Organosiloxane elastomers.

Interpolymers. G. W. Stanton and C. E. Lowry (to Dow). U. S. 2,480,680, Aug. 30. A ternary interpolymer of vinylidene chloride, α-methyl styrene, and acrylonitrile.

Cast Resin. B. M. Marks (to Du Pont). U. S. 2,480,749,50,1,2, Aug. 30. Cast resin having patterned effects is prepared and polymerized with actinic light.

Polyvinyl Alcohol. C. A. Porter (to Resistoflex). U. S. 2,480,766, Aug. 30. Polyvinyl alcohol and the reaction product of diethanolamine and hydrochloric acid.

Bending. D. B. Rossheim, F. A. Fichtmueller, and J. M. Schenk (to M. W. Kellogg). U. S. 2,480,774, Aug. 30. Method of bending thermoplastic tubing.

Interpolymers. G. D. Jones (to General Aniline). U. S. 2,480,810, Aug. 30. Interpolymers of acrylamides and allyl acetoacetates.

(*Continued on page* 224)

SILICON POLYMERS. J. F. Hyde (to Corning Glass). U. S. 2,480,822, Sept. 6. A liquid copolymeric siloxane.

COATING. C. G. Murphy and J. P. Sermattei (to Du Pont). U. S. 2,480,-824, Sept. 6. Applying strippable plastic coating to an article and thereover a webbing of a mixture of polyvinyl butyral, polyvinyl acetate, a plasticizer, and a rust-inhibitor.

METAL CLEANING. M. Frager and H. Iserson. U. S. 2,480,845, Sept. 6. Thermosetting plastics are removed from metal by electrolysis.

SHEET LUMBER. W. C. Goss (to United Sheetwood). U. S. 2,480,851, Sept. 6. A mixture of fibrous material and thermoplastic binder is formed into a porous pad, pressed with heat, further compressed in the presence of high-pressure steam, and cooled while still under pressure.

SEAM. W. E. Schmidt and J. A. Ritzler (to Warren Featherbone). U. S. 2,480,882, Sept. 6. Apparatus for interconnecting two pieces of fabric each coated with resin adapted to set with heat.

POLYMERIZATION. E. C. Hurdis (to U. S. Rubber). U. S. 2,480,928, Sept. 6. Method of controlling oil-phase gelling and polymerization of a mixture of a polyhydric alcohol ester of an alphaolefinic dicarboxylic acid and a liquid, unsaturated polymerizable compound in the presence of a peroxy catalyst.

ION EXCHANGE. S. P. Rowland (to Rohm and Haas). U. S. 2,480,970, Sept. 6. Condensing a phenol with phthalic anhydride in the presence of sulfuric acid, neutralizing, and heat condensing with formaldehyde until a gel is formed, drying, and heating to an infusible porous mass, and converting to the hydrogen form.

ORGANOSILOXANES. E. L. Warwick (to Corning Glass). U. S. 2,481,052, Sept. 6. Heating liquid organo-siloxane with a diacyl peroxide until viscosity increases.

POLYVINYL CHLORIDE. D. Cleverdon and H. P. Staudinger (to Distillers, Ltd.). U. S. 2,481,086, Sept. 6. Polyvinyl chloride resin stabilized with a dibutyl dialkoxy compound of a Group IVb metal.

ADHESIVE. A. L. Fox (to General Aniline). U. S. 2,481,100, Sept. 6. A dispersion of a vinyl alkyl ether,

the dispersing agent being ammonium caseinate.

Molding Composition. H. L. J. Marshall (to Paterson Plastics). U. S. 2,481,136, Sept. 6. Thermosetting plastic prepared by contacting disintegrated wood with formaldehyde and ethylene dichloride and subsequently with urea.

Linear Polymers. R. C. Morris and J. L. Van Winkle (to Shell Development). U. S. 2,481,140, Sept. 6. A sulfurized low-molecular-weight polymer of 2-methyl-1,3-pentadiene and 4-methyl-1,3-pentadiene.

Resin. F. C. Schaefer (to American Cyanamid). U. S. 2,481,155, Sept. 6. Resinous reaction products of an aldehyde and a thermoplastic reaction product of a triazine and a dihydric alcohol.

Polyethylene. V. K. Babayan (to Pierce Laboratory). U. S. 2,481,188, Sept. 6. Chlorinated polyethylene.

Polarized Image. A. Barnes (to Polaroid). U. S. 2,481,189, Sept. 6. A base layer, an image-receiving layer of a polyvinyl compound which is molecularly oriented, and maleic acid distributed therethrough and removable by aqueous solution.

Polyvinyl Compounds. P. Corbiere and R. Stuchlik (to Societe Rhodiaceta) U. S. 2,481,294, Sept. 6. Solutions of polyvinyl chloride in carbon disulfide-acetone mixture.

Stabilization. P. J. Garner and P. G. Croft-White (to Shell Development). U. S. 2,481,307, Sept. 6. Polyvinyl chloride stabilized with barium octylsalicylate.

Silicon Polymers. N. P. Robie (to Carborundum). U. S. 2,481,349, Sept. 6. Polymerization of silicols.

Polyvinyl Esters. H. W. Bryant (to Du Pont). U. S. 2,481,388, Sept. 6. Dissolving guanidine carbonate in methanol, adding carbon dioxide, dissolving polyvinyl acetate therein and heating under reflux to hydrolyze the latter.

Heat Sealing. T. W. Winstead. U. S. 2,481,554, Sept. 13. Apparatus for heat-bonding thermoplastic film.

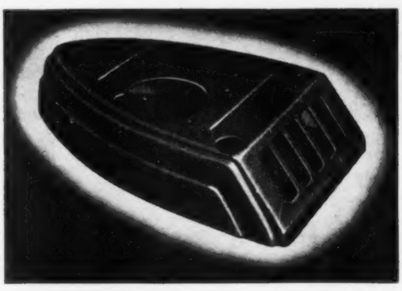
Polysulfone Resins. E. P. Irany and H. D. Noether (to Celanese). U. S. 2,481,596, Sept. 13. Polysulfone resins prepared by reacting olefins with sulfur dioxide stabilized with a sulfhydryl compound.

ONE PROCESS — TWO RESULTS

GREATER EYE APPEAL–LOWER COST

Now—as the stern law of Supply and Demand cracks down, manufacturers are searching as never before for ways to give the public MORE for *less.*

And that is where the Hawley Moulded Fibre Preform Process, with its two-in-one result, comes into the picture. Right off this process enables you to meet the difficult problems of Contour Styling, Sturdiness, High Impact and Flexural Characteristics, thus gaining smart appearance and longer life. Result! — you have a product that *stands up* and *stands out* under today's severe conditions of eye-competition and price-competition.



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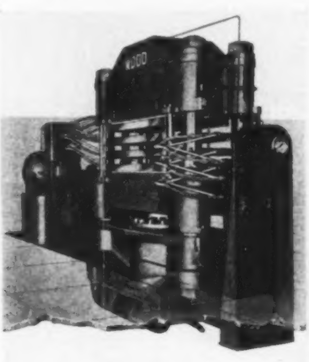
NEW MACHINERY AND EQUIPMENT

Electronic Pyrometer — Industrial users with operations requiring precise medium- and high-temperature controls will be interested in the Loudon Electronic Controller recently introduced by Loudon Instruments, Inc., 5644 Lake Park Ave., Chicago, Ill. Constructed to withstand severe conditions of dust, fumes, and vibration, the equipment is available with 13 standard measuring ranges. Employing a sensitive thermocouple element, the instrument has a measuring circuit consisting of a null balance potentiometer with automatic cold junction compensation. Other features are: unbalance voltages are converted to AC and amplified electronically; control action is continuous and high speed; and frequency of standardizing is greatly reduced by a new battery and circuit.

Embossing-Polishing Press—Embossing and polishing operations are combined in a three-opening, hydraulic platen press with a 500-ton capacity recently introduced by R. D. Wood Co., Public Ledger Bldg.,



Philadelphia 5, Pa. Capable of semiautomatic and manual operation through use of a selector switch, the press is self-contained and is furnished with a radial piston-type pumping unit, hydraulic operating valves and piping, and temperature control equipment.

Polishing is accomplished by four steam platens 26 by 54 in. in size, and spaced 3 in. apart. For embossing, the three upper steam platens are secured in their "up" position and the moving platen blocked to provide a single 4¾-in. opening. The embossing die is attached to the No. 3 steam platen, and the bottom platen is used as the embossing anvil. The press pump is driven by a 25-hp. motor.

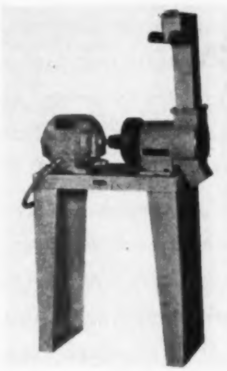
Infra-Red Preheater—Recently introduced to the trade is an infrared preheater for preforms. Known as the Roto-Veyor and manufactured by Miskella Infra-Red Co., E. 73rd and Grand Ave., Cleveland 4,

Ohio, the unit is said to speed-up transfer molding operations and to permit molding larger pieces on smaller presses.

Preforms to be heated can be of any size or shape, but not in excess of 1 in. thick. Additional advantages claimed for the unit include: reduces the amount of moisture in preforms before they are placed in the die, thus improving the electrical properties; increases the dimensional stability of the molded parts; and speeds up the cure.

In operation, the following procedure is observed: preforms are placed in empty "serving trays" resting on work tables; loaded tray is placed on one of the turntables (the Roto-Veyor is available in two models with one and two turntables, respectively); loaded tray is removed from turntable and heated preforms are loaded in die; empty tray is replaced on work table for another loading. (One turntable is always processing preforms while the other turntable is being loaded and unloaded.) In this four-phase operation, the unit's timers, temperature controls, and switches have been previously set to suit the job in process.

Plastic Granulator—Thermoplastic materials of all types can be granulated on the No. 60 Plastic Granulator, manufactured by the



Moslo Machinery Co., 2443 Prospect Ave., Cleveland, Ohio. Designed for maximum cutting efficiency at the rated capacity, the equipment is capable of cutting in excess of 60 lb. per hr., based on the unit's application to styrene. Cutting blades, easily adjusted or removed for resharpening, are made from alloy steel. The cutter rotor is mounted on heavy-duty, sealed ball bearings; a heavy fly wheel is mounted on a rotor directly coupled to the motor to provide the cutter with longer life and better shearing action. Other specifications of the unit—which operates on a 1 hp. motor—include: throat size, 3 x 4 in.; standard screen of ¼ in. mesh; and dimensions of 30 in. long, 13 in. wide, and 56 in. high.

Stamping Press—A gold stamping press, the Wynnliner, which is adaptable to printing plastics, is being marketed by Wynn Mfg. Co., 5110 Germantown Ave., Philadelphia 44, Pa. The press, which prints objects paper thin or up to 2 in. in thickness, is particularly suitable for decorating and personalizing

NEW! VAN DORN
2-ounce Injection Press

Utilizing the same rugged construction with doubled capacity, this Van Dorn press now offers you more profitable production with molding time reduced 30% to 50%. The new press has a larger heating cylinder with more plasticizing capacity; greater injection pressure; faster cycling due to larger motor and pump; and a unit for cooling hydraulic oil.

Surprisingly low in price, this versatile press uses inexpensive molds, can be set up by one man in 20 minutes, and operates 8 hours for under 1 dollar!

With all these features, this remarkable press is *unequalled* in the 2-ounce capacity class for molding practically all thermoplastics, including nylon.

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such plastic items as trays, cigarette boxes, and costume jewelry. It also has wide potentialities in imprinting trade marks on both fabricated and molded plastics. The electrically-heated Wynnliner—which imprints single lines up to 3 in. long in gold, silver, and colors—takes up to 36-point type of any standard make, and prints from changeable type, dies, and linotype.

Pilot Valves—For direct control of small cylinders or automatic control of large cylinders, Hanna Engineering Works, 1765 Elston Ave., Chicago 22, Ill., introduces a series of small pilot valves. These are available in cam-, lever-, push button- or foot-operated types. All are three-way valves except the foot-operated units which are four-way. Cam-operated valves feature a spring-loaded roller which can be actuated by a straight line or rotary cam. The roller can be rotated 90°. In the lever operated unit, the lever can be rotated 90°. The double pedal type gives full control of both directions of cylinder; the single pedal valve offers semi-automatic control.

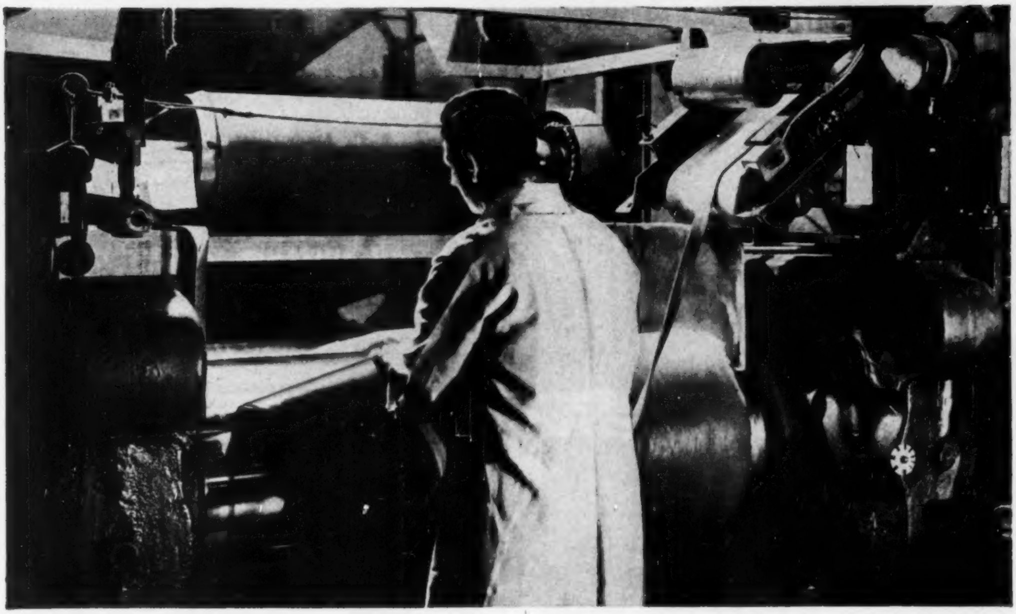
Roughing-Finishing Grinder—Designed to make roughing and finishing operations with carbide rotary files available at a modest price is the new Roto-Master Hi-Speed grinder introduced by Metal Removal Co., 1014 N. Ashland Ave., Chicago 22, Ill. Major features are a simple operating wrenchless collet-type chuck and sealed micro-precision ball bearings. The grinder operates on an air-cooled motor capable of developing 38,000 r.p.m. on 110-130 AC or DC. Collets are interchangeable for $\frac{3}{32}$- and $\frac{1}{4}$-in. attachments.

Slitter—A variety of bindings can be cut quickly from rolls of various materials at point of manufacture with a slitter offered by Charles Beck Machine Corp., 414 No. 13th St., Philadelphia 8, Pa. Grooves are set $\frac{1}{8}$ in. apart to allow for easy setting of the blades. Speed adjustments can be made while the equipment is running.

Dust Collector—Adaptable to all types of plastic molding machines is the new Stokes Dust Collector developed by F. J. Stokes Machine Co., 5900 Tabor Rd., Philadelphia 20, Pa. Available in 90- and 150-cfm capacities, the unit will handle such dusts as plastic molding compound resins and tablet powders. Highlights claimed by the manufacturer for the equipment are: con-

Have you tried PLIOVIC —that easier processing vinyl resin?

PLIOVIC mills at lower temperatures, handles easier.



Pliovic is a new vinyl chloride type copolymer, possessing superior processability. More efficient internal plasticization and a lower fusing temperature account for the desirable processing characteristics of this resin. Produced in a modern, up-to-date plant, **Pliovic** is available in two types:

PLIOVIC A—for vinyl products of quality

Pliovic A may be used alone or in combination with other vinyl resins—as a compounding agent—to give easier processing. It can be milled or Banbury mixed—calendered or extruded at lower temperatures and needs less plasticizer than copolymers of comparable molecular weight. High strength, excellent resistance to flex-fatigue, toughness at low temperatures have been maintained in this resin as well as good age and light stability and chemical resistance. **Pliovic A** has been use-proved in calendered films, flooring, extruded hose and tubing.

PLIOVIC AO—for organosols

For use in organosols, **Pliovic AO** can be formulated to give films of high strength and toughness, excellent clarity with lower fusing or heat sealing temperature requirements. Write for full details to Goodyear, Chemical Division, Akron 16, Ohio.

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GOODYEAR

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tinuous full capacity; easy cleaning; minimum wear; quick dust disposal; simple installation and maintenance; and complete material salvage.

Pantograph Engraver—Capable of engraving and profiling in steel dies and molds, a new Panto-Engraver has been announced by H. P. Preis Engraving Machine Co., 651 State Highway 29, Hillside, N. J. The open throat of the rugged machine permits engraving to the center of a 30 in. diameter dial or panel. Pantograph ratios range from 1:1 to infinity. Angular contact ball bearings insure accurate assembly and easy adjustment to eliminate play or compensate for wear. The machine is powered by a ¼ h.p. motor. Six cutter spindle speeds are provided, ranging from 5000 to 14,000 r.p.m. The standard work table is 6 in. by 12 in. with an auxiliary 18 in. by 24 in. table available. Maximum work height is 6 in., cross feed is 6 in., and longitudinal feed is 6½ inches. All the dials are graduated with 0.001 in. scales. The collet type spindle can take collets for standard shank or tapered shank cutters.

Tumbling Machine—Ball bearing equipment throughout, an improved tumbling machine for deburring, definning, cutting, etc., has been announced by Lupomatic Industries, Inc., 4510 Bullard Ave., New York 66, N. Y. These bearings are mounted on a raised frame for positive direct support of all drive mechanism. A chain gear drive with constant speed motor assures uniform power and speed at all times, but the unit can readily be converted to provide any speed required.

Speed Control Valve—Employing a guided poppet of ample diameter to allow full pipe-size flow toward the pneumatic cylinder, an improved speed control valve is being marketed by Hannifin Corp., 1154 S. Kilbourn Ave., Chicago 24, Ill. Flow of air away from the cylinder is metered by means of a large-diameter, tapered valve stem which permits accurate adjustment from zero to maximum capacity. For speed control in both directions on double-acting air cylinders, valves are used in each of the lines leading to the cylinder ports. The new "Type S" valve is constructed of corrosion-resistant material and is suitable for speed control on lines having pressures up to 150 p.s.i. The valve is made for ¼, ⅜, ½, and ¾ in. pipe sizes.

BOOKS AND BOOKLETS

Write for these publications to the companies listed. Unless otherwise specified, they will be sent gratis to executives who request them on business stationery.

"Synthetic Methods of Organic Chemistry—Volumes I, II, & III," by W. Theilheimer.

Published by Interscience Publishers, Inc., 215 Fourth Ave., New York 3, N. Y. Vol. I: 1948. Price $5.00. 264 pages. Vol. II: 1949. Price $7.50. 336 pages. Vol. III: 1949. Price $10.00. 420 pages.

These three volumes present a critical review of the current literature on new methods, significant variations of known methods, and the older, time-proved methods of organic chemistry. The volumes are essentially references, with each entry a short summary limited to the names of starting materials and products, the reaction conditions, and the yields. Volume I reviews literature from 1942 to 1944. Volume II reviews mostly European literature from 1945 to 1946. Volume III presents American literature from 1946 to 1947 with supplementary references to papers published during 1948. Volume III is published in German. For convenience of English-speaking readers, an English translation key of difficult German terms is appended to the cumulative indexes of the volumes.

"Experimental Plastics for Students," by C. A. Redfarn and A. Allcott.

Published by Iliffe & Sons Ltd., Dorset House, Stamford St., London, S. E. 1., England. Price 10/6d. 90 pages.

Contained in this practical book are 36 exercises designed to help plastics students achieve an understanding of the principles involved in the production of plastic materials. Most of the exercises, which have been thoroughly tested, can be carried out by any organization which has a small set of rollers, a steam-heated and water-cooled press, a steam supply of 150 p.s.i., and a chemical bench with ordinary laboratory apparatus.

"Industrial Rheology and Rheological Structures," by Henry Green.

Published by John Wiley and Sons, Inc., 440 Fourth Ave., New York 16, N. Y. 1949. Price $5.50. 311 pages.

A unique discussion of the flow properties of plastic substances and their measurement in the laboratory is presented by the author. The rheological system which he describes for use in either research or plant control is based on his experience in academic and industrial laboratories. Various types of instruments used in measuring flow of industrial products are analyzed. The role of the particle in the rheological behavior of industrial suspensions is considered and methods for measuring particle size are reviewed. Of special interest are the statements included in the Appendix for the laboratory investigator and director, respectively, to assist them in recognizing and promoting the functions of the rheological department in the industrial laboratory.

Power dome air cylinders (Bulletin PD-120—Comprehensive data, including dimensional drawings, are presented in this 11-page booklet on the company's non-rotating, double-acting air cylinders. *W. C. Richards, Jr., The Bellows Co., 222 W. Market St., Akron, Ohio.*

Plasticizers—Information on all plasticizers manufactured by the company is presented in this 12-page booklet. Of particular interest to the plastic and protective coating industries are the specifications of a new low-color dioctyl phthalate. Two glyceryl esters and other phthalate plasticizers are also included. *Tennessee Eastman Corp., Kingsport, Tenn.*

SR-4[R] strain gages, instruments, and accessories—Gages are classified in this 12-page booklet by types of wire and cementing materials to be used. In general, the booklet shows extensive price reductions from last year. *The Baldwin Locomotive Works, Philadelphia 42, Pa.*

Processing, tooling, and production—The complete range of styles, sizes, and capacities of fast-acting toggle clamps as made by the company is described in this 32-page catalog. The clamps are used in plastics production for holding work during cementing, machining, assembly, and inspection. *Detroit Stamping Co., 327 Midland Ave., Detroit 2, Mich.*

Physical properties of synthetic organic chemicals (Form 6136—The 1950 edition of this 16-page booklet contains data on applications and physical properties for more than 200 synthetic organic chemicals. The material is presented in tabular form for ready and easy reference. *Carbide and Carbon Chemicals Corp., 30 E. 42nd St., New York 17, N. Y.*

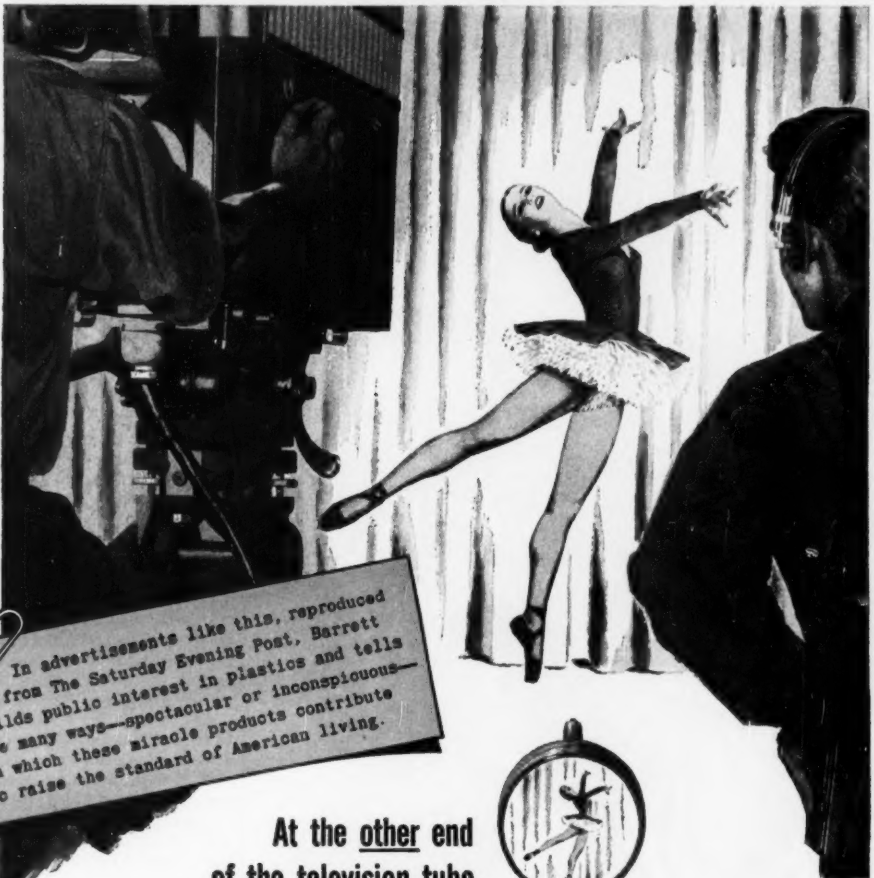
Annual report of the National Bureau of Standards for 1948—This 272-page booklet just published by the National Bureau of Standards is a summary of investigations in the field of physical science. The booklet is available for 25¢ a copy. Remittances from foreign countries must be in United States exchange and must include an additional sum of one-third the publication price to cover mailing costs. *Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C.*

Merchandising—Illustrated and described in this merchandising catalog is the company's line of safety switches, motor controls, and electrical specialties. *Cutler-Hammer, Inc., 492 No. 12th St., Milwaukee 1, Wisc.*

Rosite inorganic plastic moldings (Bulletin No. 100)—Included in this 6-page bulletin are discussions and recommendations concerning moldings for general purpose electrical insulators, for electrical insulators in arcing zones, for electrical insulators for high temperature uses, and for panels and switch bases. Complete data on the general characteristics of the material are also presented. *Rostone Corp., 139 So. Earl Ave., Lafayette, Ind.*

Food production, preparation, and preservation—The contributions of chemistry to the production, processing, packaging, and merchandising of food are briefly described in this booklet. Included is a list of the company's products by use. *Monsanto Chemical Co., St. Louis 4, Mo.*

Calcium carbide background—A history of calcium carbide which traces the product's development from the time of its discovery 50 years ago to its current and potential usage is presented in a 16-page booklet, "The Miracle of Calcium Carbide." The release points out that calcium carbide gas (acetylene), was first prominent as an illuminating gas, later was widely used as a



At the other end of the television tube...

At the back end of your television tube—the end you never see—there's a little cap with an interesting job to do.

This is where all the "strings" are finally tied together and electronics starts to become entertainment. In go the electrons and out comes the picture!

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"ELASTEX" 10-P Plasticizer	Cresols
"ELASTEX" 50-B Plasticizer	Cresylic Acids
"ELASTEX" 28-P Plasticizer	Toluol

*Reg. U. S. Pat. Off.

fuel gas for welding and cutting metals, and has recently become an important raw material in making plastics and synthetic rubbers. *National Carbide Corp., Room 1656, 60 E. 42nd St., New York 17, N. Y.*

Improved resins—The latest advances in coatings based on Bakelite and Vinylite resins, which were displayed by the manufacturer at the 1949 Paint Industries' Show, are summarized in a 14-page pamphlet. *Bakelite Corp. 30 E. 42nd St., New York 17, N. Y.*

The Franklin Institute Laboratories for research and development—Some of the investigations for which the Franklin Institute laboratories are equipped are described in this illustrated brochure. These cover the fields of physics, high polymer research, radiation, friction, communications, aeronautics, etc. *Administration Div., The Franklin Institute Laboratories, Benjamin Franklin Parkway at 20th St., Philadelphia 3, Pa.*

Res-O-Dors (Technical Bulletin 49-3)—Descriptions of five new aromatic materials, called Res-O-Dors, designed to eliminate the disagreeable odors sometimes found in finished plastic products, are contained in this bulletin. *Sindar Corp., 330 W. 42nd St., New York 18, N. Y.*

Extruded plastics—Listings of the different plastics tubings, shapes, rods, sheets, and containers that the company has in stock are contained in this 16-page booklet. Included are storage and packaging containers; fittings for pipe and tubings; and channels, edgings, nosings, splicers, tees, etc. *Julius Blum & Co., 532-540 W. 22nd St., New York 11, N. Y.*

The ECA and small business—Designed to help American businessmen who plan to enter the export market under the Marshall Plan, this booklet explains the various methods of organizing for overseas trade, listing the advantages and disadvantages of each method. *Economic Cooperation Administration, 800 Connecticut Ave., N. W., Washington 25, D. C.*

Watch your customer complaints—This four-page folder, describing how every company should insure its reputation in the field by the proper handling of customer complaints, is illustrated with charts and analysis sheets. Sample problems and calculations are given. 10¢


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is required to cover mailing and handling costs. *V. W. Palen, Bureau of Public Information, New York University, College of Engineering, New York 53, N. Y.*

Traveling-oven recording thermometer (Bulletin No. T842)—The use of the traveling-oven recording thermometer is described in finishing, lacquering, japanning, drying, and baking operations. Specifications and prices are given. *The Bristol Co., Sales Promotion Dept., Waterbury 91, Conn.*

Stock relays for industrial and general-purpose use (Catalog D-20A)—This catalog describes and illustrates the various types of relays and gives contact ratings, coil specifications, sizes, current list prices, and other data on AC & DC units. *Ward Leonard Electric Co., Electronic Distributor Div., 53 W. Jackson Blvd., Chicago 2, Ill.*

History of widely-used chemicals—The diversified application of eight major groups of chemical products to American industry is incorporated in a 16-page booklet, "The Chemicals You Live By." Written in non-technical terms to relate a story of interest to the consuming public, the pamphlet outlines the "everyday" functions of soda ash, caustic soda, chlorine, bicarbonate of soda, silicates, calcium carbonates, chromates, and specialty chemicals. *Diamond Alkali Co., 300 Union Commerce Bldg., Cleveland 14, Ohio.*

Industrial clamp—Principles, applications, and characteristics of a new industrialized clamp are described in a two-color technical bulletin, "Neg'ator Clamps for Industry." Using illustrations liberally to achieve "know-how" through "show-how", the four-page brochure outlines the fundamental assets of the device in engineering, development, maintenance, and production activities. *Hunter Spring Co., Lansdale, Pa.*

Glass fiber building material—A photographic record of the many uses of Alsynite—a translucent, corrugated, glass fiber laminate building material—accompanied by reports of the material's performance under tests, is embodied in a voluminous booklet. Brochures appended to the publication outline the product's highlights which the manufacturer put forth as: durability; rot- and weather-proofness; unlimited color as an aid to creative decoration; economy; and shatter re-

sistance. *Allied Synthetics Co., 4654 De Soto St., San Diego 9, Calif.*

Fastening specialities—A 28-page manual, adequately punctuated with sketches and diagrams, presents the scope of Southco fasteners, blind rivets, anchor nuts, panel fasteners, door-retaining springs, and other specialties. Among the many combinations described are fastening metal-to-metal and metal-to-plywood. *South Chester Corp., Finance Bldg., Philadelphia 2 Pa.*

Houseware catalog—Geared to the theme of eye- and buy-appeal merchandising is a new catalog with a five-color cover describing Rogers' houseware items. Featured is a discussion of how the more than 40 items in the line can give rapid turnover, greater sales, and bigger profits. *Rogers Plastic Corp., West Warren, Mass.*

Wood preservative—The fungicidal effectiveness of Non-Tox, the new Tuf-On non-toxic wood preservative, is described in the four-page October issue of *Coating Corner*, the manufacturer's house organ. Featured is the fact that the material is not hazardous to workmen. *Brooklyn Varnish Mfg. Co., Inc., 50 Jay St., Brooklyn 1, N. Y.*

Sludge solvent—A fast-acting fuel oil additive which dissolves sludge in oil storage tanks and piping systems is described in a 6-page folder "Make Sludge Burnable!" The solvent is reported to improve operating efficiency of oil heating systems. *E. F. Houghton & Co., 303 W. Lehigh Ave., Philadelphia 33, Pa.*

Resin emulsions—Properties, applications, and other pertinent information about "Paracols" is given in a recently issued 4-page folder. Brief descriptions are presented of these wax and wax resin emulsions, together with information on how they may be used in the manufacture of paper and board. *Hercules Powder Co., Wilmington, Del.*

Buying guide—A new 20-page bulletin covering the products of Allis-Chalmers illustrates and describes pumps; pulverators; crushers; crushing rolls; grinding, blade, and flaking mills; screens; sifters; kilns; electronic heaters; coolers; dryers; power and power transmission equipment; motors; controls; blowers; washers; service elevators; and solvent extraction equipment. *Allis-Chalmers, Milwaukee 1, Wis.*


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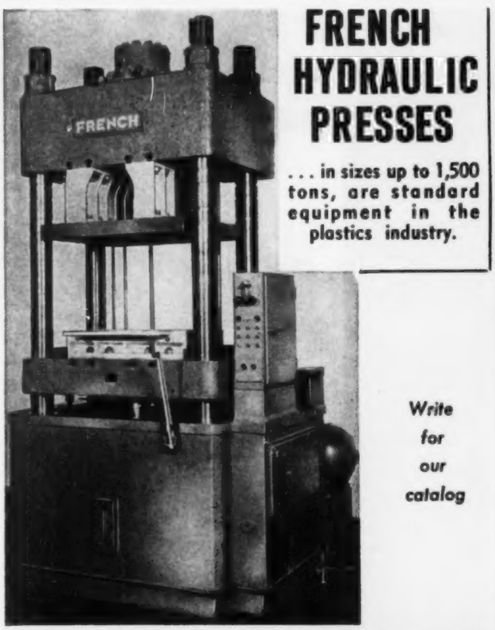
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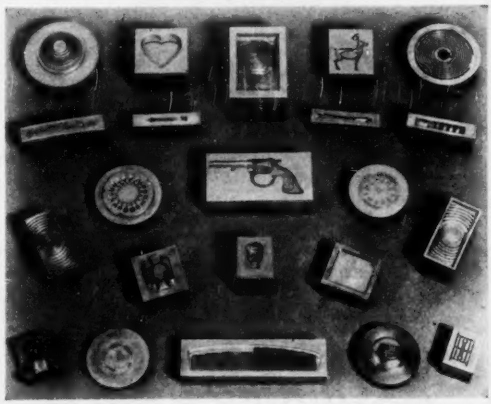

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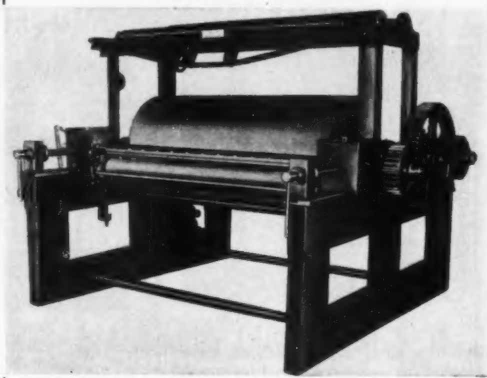

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Production of

FOR THE purpose of this report, production is the sum of the quantities of materials produced for consumption in the producing plant, for transfer to other plants of the same company, and for sale. Sales include only the quantities involved in bona fide sales in which title passes to the purchaser.

The figures of sale given in the present report are not comparable with those for consumption in the producing plants plus shipments to other plants

PLASTICS AND SYNTHETIC RESIN PRODUCTION
From Statistics Compiled by

Materials	*Total prod'n first 9 mos. 1949*
CELLULOSE PLASTICS:[a]	
Cellulose acetate and mixed ester plastics:	
Sheets, continuous:	
Under 0.003 gage	4,891,642
0.003 gage and over	5,503,301
All other sheets, rods, and tubes	3,003,148
Molding and extrusion materials	39,164,405
Nitrocellulose:	
Sheets	4,542,007
Rods and tubes	1,136,588
Other cellulose plastics[b]	5,848,270
PHENOLIC AND OTHER TAR ACID RESINS:	
Laminating	29,044,642
Adhesives	19,378,109
Molding materials[a]	82,811,254
Protective coatings (containing less than 10% modifier)	12,008,813
Miscellaneous uses, including casting	30,641,032
UREA AND MELAMINE RESINS:	
Adhesives	28,319,316
Textile- and paper-treating resins	19,770,098
Protective coatings, modified and unmodified	12,193,209
Miscellaneous uses, including laminating and molding[c]	33,288,223
STYRENE AND STYRENE DERIVATIVE POLYMER AND COPOLYMER RESINS:	
Molding materials[a]	129,926,201
Miscellaneous uses[d]	20,366,326
VINYL RESINS:	
Sheeting and film, including safety-glass sheeting[a]	105,453,608
Adhesive (resin content)	8,238,294
Textile- and paper-treating resins, including spreader and calendering types (resin content)[e]	20,747,453
Molding material (resin content)	52,944,179
Miscellaneous uses (resin content)[e]	12,646,382
MISCELLANEOUS SYNTHETIC PLASTICS AND RESIN MATERIALS:	
Molding materials[a, f]	32,986,543
Protective coatings[g]	35,629,768
All other uses[h]	112,763,025

[a] Includes fillers, plasticizers, and extenders. [b] Includes sheets, rods, and tubes, and molding and extrusion materials. [c] Data on resins for laminating and miscellaneous uses are on a dry basis; data on molding materials are on the basis of total weight. [d] Excludes data on protective coating resins; these data are included with miscellaneous coating resins to avoid disclosure of operations of individual companies.

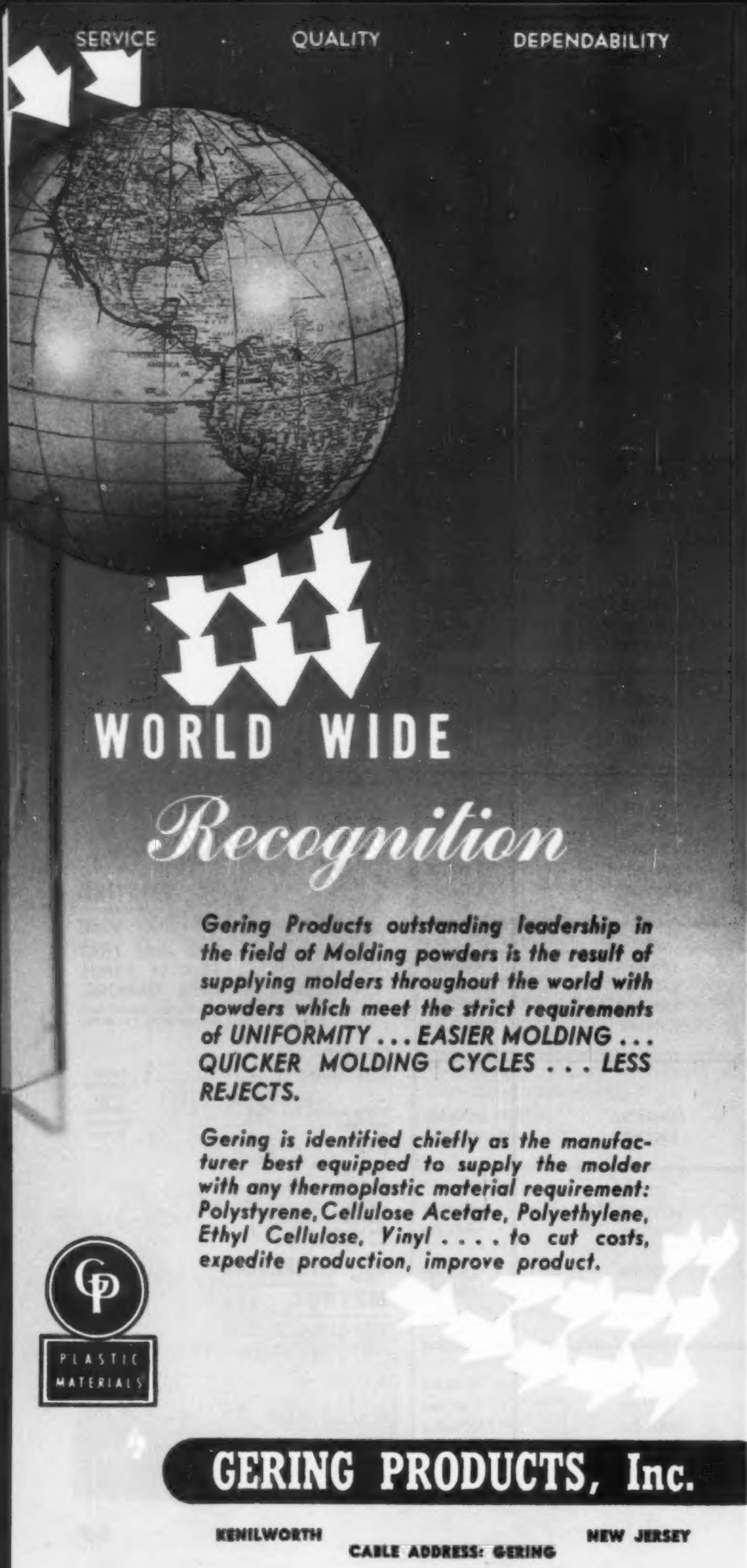
Plastics Materials

given in earlier reports. The figures for production given in the present report, however, would be comparable with figures for consumption in producing plants plus shipments given in earlier reports except for inventory changes. From month to month these changes in inventory may be substantial, but over several months they tend to even out.

IN POUNDS FOR AUGUST AND SEPT., 1949
U. S. Tariff Commission

August 1949		*September 1949*	
Production	*Sales*	*Production*	*Sales*
509,688	551,565	599,711	644,423
593,494	620,582	644,132	662,059
302,268	256,856	286,291	289,806
4,626,375	4,254,062	5,798,239	5,513,408
382,926	371,148	297,066	421,224
133,707[1]	196,408[1]	133,474	127,395
113,102	398,818	711,757	786,438
2,913,656[1]	2,021,125[1]	3,794,222	2,357,810
2,736,576[1]	2,590,456[1]	2,705,755	2,328,182
8,714,855[1]	8,860,384[1]	11,907,561	11,027,303
1,515,036[1]	1,161,148[1]	1,575,346	1,146,226
3,468,709[1]	3,826,683[1]	4,152,785	4,158,589
3,883,602[1]	3,710,211[1]	4,070,492	4,030,560
2,985,464[1]	2,375,929[1]	2,858,430	2,139,737
1,598,838[1]	1,495,768[1]	1,831,930	1,575,787
2,700,410[1]	3,534,467[1]	3,370,043	3,513,337
16,745,593	16,125,263	17,720,473	19,709,302
3,003,424	2,828,975	3,002,393	2,732,124
12,849,138	14,719,235	15,818,104	16,626,520
1,542,183	1,043,452	1,131,330	1,076,892
2,125,269	2,732,626	2,631,919	2,922,889
6,329,619	7,541,483	7,806,587	7,460,058
816,465	838,790	1,718,351	955,335
4,094,300[1]	2,811,507[1]	4,326,907	3,278,665
4,639,554[1]	4,912,666[1]	5,357,287	5,407,863
12,551,504[1]	12,953,005[1]	15,071,677	15,115,874

[e] Includes data for spreader and calendering type resins. [f] Includes data for acrylic, polyethylene, nylon, and other molding materials. [g] Includes data for coumarone-indene, petroleum, silicone, and other protective coating resins. [h] Includes data for acrylic, alkyd, coumarone-indene, nylon, petroleum, silicone, and other plastics and resins for miscellaneous uses. [1] Revised.



London Letter

THE New Year sees the British plastics industry in a much healthier position than it was six months ago. With the exception of phenolics, practically all materials are selling well. Some, such as the acrylics, are in danger of being over-sold.

In overseas markets, British manufacturers are now able to meet American competition. An example of this is in polyethylene. Before devaluation, the U. S. price was 47¢ per lb. or 2/3½d. At the current exchange rate, the price is 3/3½d. against the British price of 3/3d.

In the home market, an increasing tonnage of acrylic sheet is being used in street-lighting lanterns. It is estimated that 90% of all fluorescent street-lighting units made in Britain use acrylic for the enclosing dish and/or the refractor plates.

Polyethylene film has found a new application as an underlay for acid-resisting brickwork. Polyethylene film 0.010 in. thick made by I.C.I. is laid between the concrete sub-floor and the brick or tile floor.

Rigid polyvinyl chloride is being produced in three forms: thick sheeting for chemical plant construction and spectacle frames, powder for molding, and granules for extrusion. So far the greatest outlet for rigid p.v.c. is in chemical plants as a tank lining. Extruded rigid p.v.c. is being used for fountain pen barrels and electrical conduits.

Nylon film 0.003 in. thick has been evaluated by the medical profession as occlusive surgical dressing, and the application shows great promise for 1950. The new dressing takes the form of a "window frame" made of polyvinyl material coated with adhesive. The nylon film is put between two layers of the adhesive material, leaving one adhesive surface for application to the underlying skin. The dressing is bacteria-proof and will adhere satisfactorily for days.

Low pressure laminating resins, two of which are produced in the U.K., are beginning to find applications. Marston Excelsior Ltd., Birmingham, is now producing aircraft fairings made of glass fabric laminated with polyester resin.

Filter cloths and textiles woven of unplasticized polyvinyl chloride filaments and fibers (Redivin) are now being offered to British industry for specialized applications.

—John S. Trevor

Refrigerators

(*Continued from page* 108)

5 lb. against enameled steel's 13 pounds. Its insulating properties increased the efficiency of the door, and its attractive finish won sales.

In 1946, Norge began replacing glass with molded polystyrene for large parts such as meat storage trays, defrosting receptacles and, in some instances, produce storage trays. The principal disadvantages of glass for these parts included excessive weight, high breakage, low resistance to thermal shock, and susceptibility to chipping, with the possibility of glass slivers entering stored meats or other foods. Breakage on glass trays shipped to the Norge plant ran high. In contrast, breakage on the polystyrene trays has run less than 3/10 of 1%.

6½ Pounds Saved

Amos Molded Plastics, Edinburg, Ind., produced the first of these new polystyrene receptacles for Norge. They were run in clear material and had a stippled exterior surface. Whereas the largest glass Coldpack of that period weighed 8 lb., its plastic counterpart tipped the scales at only 22 oz.—a direct weight saving of 6½ lb. on one piece.

In the current Norge models, white polystyrene has supplanted for the moment the clear material for these pieces. Typical of such parts is the Coldpack for the model SD-849, of which Chicago Molded Products Corp. is a supplier. This company also supplies Norge polystyrene evaporator door liners for the same model.

Norge's interest in polystyrene for these and other large pieces is based on its economy, dimensional stability, and extremely low moisture pickup. Absence of finishing operations on plastics parts is equally important to Norge. It is estimated that the large Coldpacks and similar pieces would cost at least one-third more in anodized aluminum.

Norge's first thermoplastic evaporator door was produced by The General Products Co., Inc., Providence, R. I., in 1942; it was also the first such door used by any refrigerator manufacturer. Of clear butyrate, the door was sprayed with aluminum paint and had the word Norge and the Rollator insignia filled with gold. The company's first complete polystyrene evaporator door appeared in 1949 on one of the 6-cu.-ft. models. On other Norge refrigerators, polystyrene is teamed

up with anodized aluminum as an evaporator door liner.

Some of the important functional plastic parts used by Norge are concealed in the finished refrigerator. Examples are the tank hanger blocks, which serve as supports between the outer steel shell and the inner tank, with one used on the lock side and another on the hinge side. These parts, which must withstand considerable shock when the door is closed, and more shock in shipment, replace combinations of wood and metal, which were hard to fabricate, did not stand up well in service, and caused heat losses. Michigan Plastic Products, Inc., Grand Haven, Mich., is a supplier of these blocks, as well as of the lock strike mounting pads which are also concealed between the cabinet shell and tank.

In its exclusive Night Watch Self-D-Froster, Norge utilizes an electric mechanism to defrost certain models automatically every day. This mechanism supports a clock dial mounted in the main door. The wiring harness to this assembly must extend from the cabinet out into the door in which the unit is mounted. The three wires of this harness are protected by a special vinyl sleeve which outlasts the wires themselves through thousands of openings and closings of the door. Installation of this unit is simplified by means of a clear polystyrene plug of split construction.

Other "Firsts"

Polyethylene recently made its first appearance in Norge refrigerators in the form of a molded flexible ice cube tray supplied in combination with metal trays. This was the Eskotray, supplied by Associated Plastic Companies, Inc., Chicago, and the Roto-Tray supplied by Republic Molding Corp., Chicago. Another plastic "first" for Norge is a molded nylon lock bolt roller, which supersedes a steel roller.

Molded polystyrene shields for germicidal lamps, shelf ladders, shelf guards, tank plugs, script name plates, Hydrovoir slides, lock bolt and lock strike plate escutcheons are among the many additional plastic parts which have been used by Norge.

In addition to the suppliers mentioned above, other molders who have been active in supplying plastic parts to Norge include Erie Resistor Corp., Erie, Pa.; Plastics Div., General American Transportation Corp., Chicago; and The Standard Products Co., St. Clair, Mich.

Telephones

(*Continued from page 116*)

plastic parts. In the dial mechanism, there is a phenolic spring block which has four molded-in spring contacts and terminals. Because all the conductors are molded-in, this single piece is able to perform a function which was previously performed by a complicated assembly of springs and insulators.

The other internal parts are: a nylon pawl and cam in the dial mechanism; a transparent cellulose acetate dust cover over the rear of the dial gears; a polystyrene cover for the spring pile-up operated by the plungers; and network and equalizer terminal plates which are molded of butyrate.

Handset Molded of Phenolic

The handset of the 500-type set is slightly smaller than earlier models and weighs 25% less. The smaller size is designed to provide a better fit to the users' head. The handle, or main piece, of the handset and the two screw-on caps are molded of black phenolic. The material used is a modified general purpose compound composed of cotton flock, wood flour, and Bakelite or Durez phenolic resin. The handle pieces are compression molded in an 8-cavity die, utilizing electronic preheating. Each shot weighs 3.3 lbs. A rectangular hole is molded through the length of the handle so that wires can be run from the transmitter to the receiver end.

Under the screw-on cap in the receiver end of the handset, there is a terminal plate molded of phenolic, and a dome-shaped, phenolic-impregnated fabric diaghragm. The transmitter unit has a terminal cup molded of transparent Plexene, a styrene-base copolymer.

The foregoing discussion of the use of plastics by the Western Electric Co. deals only with their use in telephone sets. In the latest model set, six different materials are used to cut production costs, improve the appearance, or increase the efficiency of a number of different parts. And these applications are only a small part of the contribution of plastics to the telephone system. Plastics are also used in operators' headsets, plugs, control buttons, switchboards, and wiring throughout the telephone system. It would be virtually impossible to count all the specific applications—and new ones are being added to the list almost every day.

Tableware

(*Continued from page 138*)

cial market—have looked with favor on this economical tableware. For example, Clifton's Cafeterias, Los Angeles, Calif., have been successfully using Melmac tableware for the past 21 months. The Clifton management has been so pleased with the performance of the plastic tableware that it is making full conversion to Melmac service as breakage occurs with its original ceramic dishes.

Melamine Cuts Replacement Costs

Further proof of melamine tableware's successful application is offered in a study of its adoption by Columbia Teachers College, New York City. In July, 1947, a test set of 1500 pieces of Melmac plastic tableware was shipped to the Horace Mann Cafeteria of Columbia Teachers College. This particular cafeteria was selected for the test because, in addition to being a daily luncheon room, it is the site of many teas and other college functions. It was believed that by making the initial test there, all important factors might be more closely observed. The test set proved so satisfactory within the first three months that it was decided by those in authority to procure additional quantities of Melmac tableware from one of Cyanamid's molders for use in other dining rooms of Teachers College.

In September, 1947, Teachers College purchased 6588 pieces of melamine tableware, at an expenditure of $2908.24. Although more expensive than conventional chinaware, it was believed that the negligible breakage factor of melamine tableware would more than offset the higher initial cost. From September 1947 to July 1948, a complete tabulation was maintained of pieces in use, those in stock, and those pieces that were broken or lost. Information was also collected as to the number of meals served during the period and the cost of replacement per meal served.

In June, 1948, the inventory showed that of the original 6588 pieces, 1284 were in storage and 3,873 pieces were in daily use. In addition to special affairs, 544,663 meals had been served in the cafeteria. In the final tabulation, losses amounted to 1431 pieces. Of this number, 530 cups had been discarded because of coffee stains. Some of the remaining 901 pieces had been lost. The total dollar loss had amounted to $706.74 or approximately 24% of the initial investment. The cost of tableware per meal served was $.0013. It is estimated that chinaware replacement cost ranged from $1500 to $1700 per year. In comparison, the loss with melamine tableware is considerably less than half.

Proved Sanitary

On the subject of sanitation, melamine tableware has received a clean bill of health. In a test conducted in the Department of Bacteriology and Public Health of Michigan State College, china plates and plates of Melmac material were soiled and washed simultaneously. It was found that the melamine plates showed less soil than the china plates when washed for a given period of time.

The following quotations have been taken from a report of the Department of Health of the State of North Carolina:

"It has been our findings that tremendous strides have been made in developing this material (melamine) for this specific purpose (as tableware). . . . We have also found that it has been used with very good results in some of the larger eating places in the State . . . Since the first developments in the plastic dinnerware field, it is noticeable that a much better product is now on the market than first appeared some few years ago. . . . Noticeable improvement has been made in the manufacturing process."

Consumer Program Underway

Today, these proved advantages are being capitalized upon to exploit the large-volume consumer market. Quite recently, American Cyanamid launched an advertising and sales promotion campaign to run in national magazines. The campaign stresses the fact that this is a new type and style of tableware, unlike any produced before. As an adjunct to the consumer program, Cyanamid is cooperating with producers of the tableware and is aiding retailers in formulating effective point-of-sale tie-ins.

In order to stimulate interest at the retail level, Cyanamid has taken space in retail trade publications to define the merchandising program. Sales kits containing selling themes, point-of-sale material, display and publicity suggestions, and radio commercials have been made available for use by manufacturers' salesmen and retailers. These merchandising activities are being supplemented by direct mail.

With the commercial market firmly established and growing by leaps and bounds, sales-minded manufacturers of melamine tableware are eyeing the consumer market. Tableware for the domestic household calls for a restyling of the heavy dishes, cups, plates, and saucers on the commercial market. In addition to its already listed advantages, the tableware will have to appeal to Mrs. Housewife for its beauty—style and color.

One manufacturer who has cast more than an eager eye toward the consumer market is The Watertown Mfg. Co., Watertown, Conn., maker of Melmac Lifetime Ware. To its standard colors of Caribbean Blue and Bermuda Coral, Watertown has now added three new colors—Sahara Sand, Canyon Yellow, and Palisades Gray—to attract the consumer. The smart, modern styling of Lifetime Ware has not only won it a featured place in modern art exhibitions across the country, but has made it a part of the permanent collections of the Museum of Modern Art in New York City.

Another manufacturer, International Molded Plastics, Inc., Cleveland, Ohio, has brought out a completely new line of melamine tableware designed specifically for the on-rushing consumer market. International's Arrowhead Ever Ware line had been going to restaurants and institutions for the past year. However, when the possibility appeared of entering the consumer market, International decided to take a chance on a heavy expenditure for additional molds and make a complete new line of dinnerware. Through research the company came to the conclusion that square plates would be more practical than round ones for its line, in that such a shape can utilize a greater percentage of the table surface and has a space advantage in storage. In addition, the company decided that its 20-piece Brookpark pattern starter set should have colors made to harmonize with one another in order to be sold in mixed sets. The sets contain four dinner plates, four bread and butter plates, four cups and saucers, and four soup or cereal bowls in contrasting colors of chartreuse, burgundy, emerald green, and pearl gray.

Markets Opening Up

Today, tableware molded of melamine resins is enjoying increasing popularity—despite its high initial cost—because of its longer service life when compared to ceramic materials. Smart merchandising—new

styles, colors, proper promotion, and better distribution methods—has increased sales to their present high point.

The full quality and utility demands of the heavy duty or institutional tableware market have been met. In fact, that market has been given a better tableware than it ever dreamed of having.

Next step: to put the tableware in every home in America.

10,000% Increase

(*Continued from page* 142)

one, was getting the products into all the outlets handling comparable products made of older, more conventional, non-plastic materials.

According to George W. Keny, president of the company, 1947 was the decisive year in the merchandising of plastic products. Mr. Keny believes that the national variety chains led the way in demonstrating that plastic housewares could sell in volume. It was proved that mass displays of plastic products in exciting colors and sparkling finishes would make women shoppers stop, look, and buy. Noticing the space that the chains were giving the plastics items, the independents began asking their jobbers to supply them also with fast-moving plastic products. Department stores, too, came to realize that plastic products can be profitable, especially if they are mass displayed rather than spread thinly.

Informative Labelling

An important factor in successful merchandising is a well-rounded informative labelling program. A pioneer in this matter, Columbus has used millions of labels, boxes, and printed cellophane wrappers that identify the product and state its use, its advantages, what material it is made of, what the material will do for the user, and, more important, what the user *shouldn't* expect the material to do.

Today, the availability of larger presses and lower-priced plastics have combined to enable molders to produce plastic products in the "over-a-dollar" class that are proving to be real values for the discriminating buyer. To quote Mr. Keny again: "The categorical rejection of plastics products by buyers is fast becoming a rarity. The public's acceptance of plastic articles, which results in fast turnovers, is a most convincing argument to buyers."

• MANUFACTURERS' LITERATURE •

To obtain any of the booklets or catalogs listed below, simply circle the corresponding number on the post card, fill in the information requested, and mail.

MOLD STEEL
The type analysis, description, high strength, cleanness and uniformity, long-run production information, etc. on Stainless No. 2 mold steel, which gives corrosion resistance, are provided. Also included are answers to a few questions frequently asked about heat treating and finishing mold cavities. 6 pages. The Carpenter Steel Co. (1-624)

ROTOCURE
Illustrated brochure describing the advantages and applications of the Rotocure machine for continuous vulcanizing or laminating of plastic material in sheet form. 4 pages. Farrel-Birmingham Co., Inc. (1-625)

RESIN-TREATED PAPERS
Brochure describing Phenopreg RP materials which are resin-treated papers that can be used in the surfacing of plywood, veneers, and various types of construction boards. Fabricon Products, Inc. (1-626)

RESIN BINDER
Cycor 191, a liquid synthetic resin binder for sand cores and dry molds, is presented with its advantages, storage life, suggested formulations, mixing procedures, baking procedures, etc. Price schedule is included. 6 pages. American Cyanamid Co. (1-627)

PLASTIC GRANULATING MACHINE
Specifications, features, illustration, and other important information on the Moslo No. 60 Plastic granulating machine are given. Price list is included. 4 pages. Moslo Machinery Co. (1-628)

MOLD BASE ASSEMBLIES
The Van Dorn mold base assemblies are illustrated and described in this bulletin. Specifications and prices are included. 2 pages. The Van Dorn Iron Works Co. (1-629)

PLASTIC MOLDS
4-page booklet illustrating a few typical molds and sections of the factory along with a description of the growth of Standard Tool Co. (1-630)

ENGRAVER
The features and specifications of the No. 252 Engraver are given. Attachments and accessories to be used in connection with this engraver are also illustrated and described. 8 pages. Mico Instrument Co. (1-631)

MACHINE SHOP SERVICE
Illustrations and descriptions of operations for both emergency and routine repair or regular contract work as done by Barker-Davis Machine Co., Inc. (1-632)

NICKEL AND NICKEL-BASE ALLOYS
Discusses use in the design of corrosion-resistant machinery and equipment with supporting data on mechanical properties and corrosion resistance, including detailed factual application information. International Nickel Co., Inc. (1-633)

STEAM PLATEN PRESSES
Booklet describing in detail, with specifications, standard models of Baldwin steam platen presses and custom-built units of all types. 12 pages. The Baldwin Locomotive Works. (1-634)

POSTAL SCALE
The features, specifications, illustrations and other important information on the Posto-Meter Jr. Models 4S6 and 4C6 are given. 4 pages. Detecto Scales, Inc. (1-635)

ENGRAVING MACHINE
The New Hermes portable engraving machine Model M-IND is illustrated and described with specifications. Also, various engraving problems and their solutions are given. 2 pages. New Hermes, Inc. (1-636)

HYDRAULIC PRESSES
Four hydraulic presses are illustrated and described with a few specifications. Also, the 42-ton self-contained hydraulic press is included with specifications. 4 pages. Erie Engine & Mfg. Co. (1-637)

PLASTIC AND DIE CAST MOLDS
Detailed description of the heat treatment of plastic and die cast molds. Illustrations are included. 4 pages. Detroit Mold Engineering Co. (1-638)

SYNTHETIC WOOD
Machinery for the production of plywood, hardboard, and pressed wood is described. Illustrated. 6 pages. R. D. Wood Co. (1-639)

RESINS GLUES
Discussion of techniques, uses, instructions, and technical data on the use of Plaskon glues. 45-page expandable booklet. Plaskon Div., Libbey-Owens-Ford Glass Co. (1-640)

EXTRUDING MACHINES
General specifications on main drive, feed section, cylinder, stock screw, head equipment, and accessories; tabulated specifications; and illustrations are given on Davis-Standard extruding machines as produced by The Standard Machinery Co. (1-641)

PLASTICIZERS
Physical properties, compounding data, test methods, and test results on several monomeric and polymeric plasticizers. 18 pages. Rohm & Haas Co. (1-642)

EXTRUSION AND USE OF EXTRUDED PLASTICS
Report on extrusion and use of extruded plastic filaments, sheets or stripping, flexible tubing and rod, and profile shapes. A description of coating operations is also included. This information available for export distribution only. 25 pages. Omni Products Corp. (1-643)

AUTOCLAVES FOR PRESSURE-TEMPERATURE REACTIONS
Information on specifications, agitation, materials of construction, instrumentation, safety precautions, etc. 48 pages. Many illustrations and diagrams are included. Blaw-Knox Co. (1-644)

CORROSION-RESISTANT MATERIALS AND EQUIPMENT
Information is included on tygon tubing, protective coatings, lining materials, grinding and mixing equipment, chemical stoneware, white chemical porcelain, ceramics, and corrosion-resistant masonry. The U. S. Stoneware Co. 8 pages. (1-645)

ELECTRICAL INSULATION
Test data on electrical and physical properties of Voltron, a flexible plastic for electrical insulation. Charts list sizes of Voltron tubing and tape. 4 pages. Industrial Synthetics Corp. (1-646)

CARBIDE BURS
Use of carbide burs in high speed portable tools. Various types of burs are shown. Case histories give advantages of these tools. 4 pages. The Atrax Co. (1-647)

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• MANUFACTURERS' LITERATURE •

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FORMING ARTICLES FROM EXTRUDED TENITE SHEETING
Information on cutting and blanking, creasing and folding, cementing, drawing, embossing, beading, blowing, and laminating and heat sealing, in forming articles from extruded Tenite sheeting is given. Diagrams are included. 12 pages. Tennessee Eastman Corp. (1-601)

INJECTION MOLDING MACHINE
Illustrations, specifications, diagrams, and other information is given about a 1-oz. injection molding machine as produced by The Watson-Stillman Co. (1-602)

LUMARITH
Folder for paper jobbers and for retailers, giving illustrations and detailed information on packaging cut meat in Lumarith transparent film and listing a wide variety of other products for which Lumarith is suitable. 4 pages. Celanese Corp. of America. (1-603)

TEMPERATURE CONTROL UNIT
The Royle temperature control unit for continuous extrusion processes and other industrial uses is illustrated and described with information on the heat transfer medium, circulation, temperature ranges, controls, etc. 4 pages. John Royle & Sons. (1-604)

MULTI-WALL PAPER BAGS
Pocket-size booklet containing suggestions for the easier handling and storing of Monsanto plastics in multi-wall paper bags. 12 pages. Monsanto Chemical Co. (1-605)

REGULATING VALVES
Catalog giving complete information on pressure-reducing valves, lever-operated balanced valves, auxiliary operated pressure-regulating valves, and strainers for steam, water, air, gas, or oil. Prices are also included. 52 pages. Atlas Valve Co. (1-606)

HYCAR-PHENOLIC BLENDS
Technical data on compounding Hycar American Rubber with phenolic resins, and properties of resultant compositions. Many representative recipes given. 28 pages, with illustrations, tabulations, and diagrams. B. F. Goodrich Chemical Co. (1-607)

HYDRAULIC PRESSES AND EQUIPMENT
Molding, laboratory, and small production presses, together with accumulators, pumps, and other accessories used in plastics molding are illustrated and described in this 12-page booklet. Elmes Engineering Div., American Steel Foundries. (1-608)

ACRYLIC RESIN
Condensed illustrated booklet on cast "Lucite" acrylic resin, highspotting properties, uses and fabricating techniques. 28 pages. E. I. du Pont de Nemours & Co., Inc. (1-609)

FABRICATION OF ALUMINUM
Information on putting aluminum to work in the process industries, concise facts about aluminum, etc. are included in this 16-page illustrated booklet. Welding Engineers, Inc. (1-610)

XALOY AND XALOY 306
Xaloy and Xaloy 306, a solution to metal losses from severe wear and corrosion, particularly in extruding cylinders, tubers, and strainers, are described with their technical specifications. 12 pages. Industrial Research Laboratories, Ltd. (1-611)

HYDRAULIC PUMP
Illustrated booklet describing the Aldrich-Lytle, a hydraulic pump powered by compressed air (up to 100 lbs.), which produces adjustable fluid pressures up to 20,000 pounds. 4 pages. The Aldrich Pump Co. (1-612)

CARBON BLACKS
Report including tests showing the relative properties of two Cabot furnace blacks having outstanding extrusion and "smoothout" properties: namely, Sterling SO and Vulcan 1. 8 pages. Godfrey L. Cabot, Inc. (1-613)

TUBING
Description and price list of Plaxpak polyethylene layflat tubing, which is seamless, flexible, non-toxic, and gusseted, are given in this bulletin. 2 pages. Plax Corp. Div., Hartford-Empire Co. (1-614)

PRECISION MOLDED PLASTICS
Brochure illustrating and describing in 8 pages the work in compression molding, transfer molding, and injection molding as done by Consolidated Molded Products Corp. (1-615)

COMPRESSION AND TRANSFER PRESSES
Information on how to select compression and transfer molding equipment. Specifications are given. 8 pages. The Hydraulic Press Mfg. Co. (1-616)

MOLDING
Brochure illustrating and describing the features of Mack molded plastic products used in connection with foods and drugs, automobiles, cosmetics, electronics, aviation, apparel, furniture, beverages, etc. 8 pages. Mack Molding Co., Inc. (1-617)

PARTS MARKING MACHINES
Illustrations and the features of various Acromark parts marking machines are given. Three other machines for use in stamping are also presented. 6 pages. The Acromark Co. (1-618)

CELLULOSE ACETATE
Up-to-the-minute laboratory and field data on the properties and uses of cellulose acetate, including a special section on recently developed acetate laminates. Hercules Powder Co. (1-619)

HIGH-FREQUENCY SEALING OF KODAPAK SHEET
A 4-page folder describing and illustrating the use of an experimental fixture, subject to wide revision to fit production requirements. Eastman Kodak Co. (1-620)

ACRYLIC PEARL
The composition, types, properties, colors, uses, and sizes available of Acryvin's acrylic pearl, which is a perfect simulation of ocean pearl, are given. Acryvin Corp. of America. (1-621)

HEAT RESISTANT POLYSTYRENE
A reprint from the December, 1948 issue of MODERN PLASTICS, this article describes the development and characteristics of Koppers Polystyrene 8. 4 pages. Koppers Co., Inc. (1-622)

RESIN
The properties, solubility, compatibility with drying oils, compatibility with other resinous or plastic materials, and uses of Durez 220 resin (terpene phenolic, oil-soluble, high-melting, low-viscosity, thermoplastic resin) are given. 10 pages. Durez Plastics & Chemicals, Inc. (1-623)

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NEW YORK 17, N. Y.

A Better Stock

(*Continued from page* 167)

quantity and quality of such work performed.

"The greater serviceability of the butyrate gun stock is basically illustrated by the fact that many thousands of such stocks have been in use for several years. The gunsmith's record of service will show that the number of guns being returned for stock and fore-end repairs are proportionally less with the guns stocked with Tenite than those stocked with wood."

Head to Toe

(*Continued from page* 165)

doll also had an injection-molded butyrate head. In addition, the body, arms, and legs (which were latex rubber in the Magic Skin doll) were molded of butyrate. This was the first use of plastics for the body or limbs of a doll.

Acrylic Eye

The next milestone in Ideal's development of plastic doll components was the all-plastic eye. In 1947, Ideal introduced its Baby Sparkle Plenty. This doll's eyes were molded of Lucite acrylic. Before that time, doll's eyes were usually made of metal with a plastic (cellulose nitrate or butyrate) pupil. The acrylic eye cost more to produce, but was considered worth the extra cost because it improved the doll's looks so much.

Ideal's Toni doll, introduced in 1948, has head, body, and limbs molded of butyrate, acrylic eyes, and nylon hair. Nylon was chosen for the hair because it proved to be the only material which could be play-waved and shampooed repeatedly.

Vinyl Paste Resin

The latest member of Ideal's doll family is a life-like just-born infant named Snoozie. In order to combine molded-in detail and a soft "cuddly" feel, Ideal is molding Snoozie's head and limbs of vinyl paste resin. This material, which seems to have a great future in the doll field, was first used for dolls in England in 1947 and was used by Horsman Dolls, Inc., for molding doll's arms and legs in this country in 1948.

Ideal expects Snoozie to rack up sales records to compare with those of earlier Ideal big sellers. If she does, Ideal's use of plastics for doll manufacture should increase. What this means, in terms of pounds of plastics, is indicated by the figures for 1948 (the latest year for which figures are available). In that year, Ideal used 2½ million pounds of plastics in all its operations. Of this, one half a million pounds was used for making dolls.

Realism

(*Continued from page* 164)

finish, Lionel must spray-paint the molded parts. The color of the molding material is therefore unimportant, and Lionel uses only transparent polystyrene to cut costs and simplify inventory and procurement.

Molded Locomotive Bodies

Despite the success of the molded cars, Lionel was reluctant to try plastics for locomotive bodies. The engines inside the bodies are heavy and the bodies, therefore, have to have extremely high impact strength if they are not to break when dropped. In 1949, Lionel brought out its first locomotives with molded plastic bodies. The material which Lionel chose to do the job is Forticel cellulose propionate. A two-unit Diesel and a black Diesel switcher (both made with either New York Central or Santa Fe markings) are now being produced with that material.

The Diesel switcher has a brake wheel and a bell on top which had to be made with unusually thin, unbreakable sections. The secret of their durability is the resilience of the nylon of which they are molded.

Numerous Other Applications

In addition to the use of plastics in the trains themselves, there are many applications of plastics in the companion accessories which Lionel manufactures. For example, Lionel transformers, most of which were housed in steel until about two years ago, are now housed in high-impact phenolic. The automatic cattle car set has livestock molded of elastomeric vinyl. The latest model station has a roof with molded-in "shingles", walls with molded-in "clapboards", and a platform with molded-in "bricks". The platform and roof are molded of polystyrene; the walls, windows, and doors are molded of a styrene copolymer. The molded window frames are backed with sheet acetate.

One could go on almost indefinitely describing additional applications, but each would only repeat what has already been proved: In Lionel's operations, the intelligent application of plastics has made better products and better values.

Records

(*Continued from page* 135)

blending operation, the material is fed to a Banbury mixer where it is compounded. It is fed directly from the Banbury to the hopper of a 12-in. Farrel-Birmingham extruder. The extruder completes the compounding and extrudes it into a wide strip, which passes through a cooling chamber on a conveyor belt.

While the material is still hot it is scored into square preforms by two sets of rotating knives, one for slitting and the other for cutting at right angles. The material is quite cool and hard at the end of the conveyor system and as it drops off on to a table the preforms separate easily. They are then stacked by hand into material handling boxes and delivered to the molding presses.

Compression Molding

In the molding operation, preforms are placed on a hot plate until they become soft and pliable. With the press open, the top and bottom labels are assembled in position on the stampers. The preform is then placed on top of the lower label. The molding operation proceeds automatically. While the mold is open it has been heating up — and the cycle is so controlled that the moment the mold is completely closed steam is shut off, and cold circulating water is turned into the cores of the mold platen. The total time in the press is about 12 to 15 seconds. The overall cycle is about 25 seconds.

When the record is taken from the mold, it has a sizable amount of flash on the outside periphery. Mr. Pipper developed an automatic edger for these records. The operator merely places the record on a pin and presses a button. The record rotates and a sharp knife cuts the flash away. This flash is then reground and re-worked.

Injection Molded Records

In a very different category come injection-molded polystyrene records, a specialty to date in the children's field. Best Way Products, Inc., Roselle, N. J., has been molding this 6-in. type for two years, and Shelley Products, Ltd., Roslyn, L. I., has also produced many. Shelley recently engineered a four-cavity mold for 10-in. records, and reject percentages from that mold are not out of proportion, it is stated.

It is estimated that over one million lb. of the special formulation of polystyrene required was used in injection-molded records in 1949.

Toe Caps

(*Continued from page* 179)

it was found that after 12 months of continued usage, the plastic-capped boots were still fit for service.

A later problem that arose in connection with the boots was a prejudice on the part of the miners in favor of the steel toe-cap. This prejudice was attributed to the psychological effect of the self-evident steel cap. To overcome this problem, a special grade of aluminum-colored vinyl was substituted for the black material.

Although the new boot, which is now known as the Totector, is slightly more expensive than the traditional type ($4.20 for the new boot, $3.50 for the old), its wearing life is three times longer and its impact resistance much higher. It is reported that the new toe-cap will withstand an impact of up to 150 lb., whereas the old type could withstand only 50 to 60 pounds.

Nylon Zippers

(*Continued from page* 179)

Weight is an important factor because a heavy zipper can make the fabric sag and mar the appearance of the garment.

In addition, the nylon zipper is much more pleasing to the touch than metal. There are no rough edges or burrs, and no cold metallic feel when the zipper is worn against the skin.

Waldes molds the nylon zippers in 40 different colors. The nylon is colored before molding by a process developed by Waldes technicians in 1946. The color impregnates the nylon through and through, and cannot wear off, chip, or peel. The nylon will withstand dry cleaning and will take heat up to 400° F.

As far as durability is concerned, the Waldes Nylon-Zip is, for all practical purposes, "as strong and durable as metal fasteners." In maximum endurance tests, a brass fastener will appear stronger than nylon or aluminum (which are of about equal strength). But wherever the nylon zipper is recommended for a specific application, it has first been tested and proved to be as suitable from the standpoint of strength and wear as any metal fastener used for the same application.

One unusual application is a large zipper which Waldes is manufacturing for the U. S. Navy and Army for use on heavy amphibious suits. This zipper is large enough (chain size #8) so that the slider and stops can be molded of nylon. The tape is a nylon webbing; thus the zipper is actually 100% nylon. A similar #10 chain-size fastener is now being developed.

In such large sizes, the difference in weight between nylon and metal becomes increasingly important. A 31-in. #8 chain-size brass zipper, for example, weighs 4.48 oz.; a nylon zipper the same size weighs only 1.28 oz., a reduction of 71½ percent.

Raincoats

(*Continued from page* 178)

complete cessation of the manufacture of Elasti-Glass rainwear for civilians. The company's facilities were diverted to the manufacture of military equipment.

During the war, the company learned many things about the fabrication of vinyl which helped to improve its post-war products. Among the improvements were: electronic sealing and the consequent elimination of stitching; the application of snap fasteners; the use of slide fasteners. Colorful new plastic coats for men, women, and children were designed. Hat covers for men and fashionable hoods for women were added to the line.

The next big step was the use of metallic plastics and, more recently, the simulated leopard and plastic gabardines. Now Buchsbaum has just introduced "the world's lightest raincoat," made of 0.002-in. Vinylite film. The coat weighs less than 8 oz. and is so compact that it fits easily into a purse or jacket pocket. But it opens into an unwrinkled, fresh-looking, full size raincoat. It retails for $4.95.

Vinyl's Share of the Market

In just 10 years, vinyl raincoats have come a long way. Their success has been neatly summarized by Herbert Buchsbaum: "The raincoat business really needed the vinyl material, but never having had it, didn't realize the need until we started producing the coats. Today, vinyl raincoats completely fill the lower price structure of the raincoat market. I believe that more than 60% of the raincoats sold today are made of vinyl. Plastic raincoats have found a permanent place in the industry and, with proper attention to quality of material, workmanship, and smart styling, can become of even greater importance."

Pixie Camera

(*Continued from page* 132)

covers the shutter mechanism, and a small round lens bezel are molded in a four-cavity die which turns out the parts at a rate of 115 sets per hour. Tolerances of plus or minus 0.002 in. are held in molding the parts. aaRBee Plastic Co., Los Angeles, Calif., does the molding.

The front plate and lens bezel are permanently cemented in place when the camera is assembled. The back, which must be removed for insertion of the film magazine, is held in place by metal slides which engage the lugs on the back and on the main body of the camera. The joint between the two pieces is a combination of a tongue-and-groove and a lap joint, and is thus completely light-proof.

The film magazine is molded of black Lustrex by aaRBee. The two parts are held together by metal spring clips, and a lap joint prevents leakage of light at the seam. The containers for the magazines are also molded of black polystyrene. The containers are molded at a rate of 800 per hour in a 24-cavity mold by Mercury Plastics, Santa Monica, Calif. Both the magazines and the containers can be refilled and reused repeatedly.

Transparent Display Package

The Pixie camera is shipped in a two-part display package molded of Lustrex by aaRBee. The ivory-colored rectangular base has molded-in lugs which position the camera in the center of the package. The top part of the package is transparent. The name "Pixie" is hot stamped on the flat part of the front of the base. Whittaker does the stamping on the package, and all the lettering on the camera, with foil stamping machines made by Kingsley Stamping Machine Co., Hollywood, Calif.

The special viewer which is used to look at Pixie color transparency strips has a polystyrene body and a lens of the same material molded by Craftsmen's Guild, Hollywood. The lenses are produced in a 10-cavity mold at the rate of 1000 lenses per hour. The diffusion sheet in the viewer is 0.010-in. thick cellulose acetate.

Whittaker's success with the Pixie and its satisfaction with Lustrex polystyrene are proved by the company's plans for the immediate future: a "Flash Pixie" with a flash unit molded of the same plastic material used in the camera.


Royalite
Bowling Post for Brunswick-Balke-Collender Co., Inc.
Stone Guard for Truck
Refrigerator Breaker Strip
Typewriter Case for L. C. Smith, Inc.
Bowling Stand for Brunswick-Balke-Collender Co., Inc.
Tote Box
Radio Case
Kitchen Sink for Boat or Trailer
Projector Case for Revere Cameras, Inc.
Television Mask
Radio Set Dial Face
U.S. Royalite
US
UNITED STATES
2638 NORTH PULASKI ROAD

Year in Review

(*Continued from page 212*)

ment (230), nylon film for surgical dressings (231), a polyethylene container for direct administration of a nasal spray (232), and a phenolic cabinet for a diagnostic heart meter (233). The latter cabinet with its case proper, door, and drawer weighs approximately 12 lb. and costs about one-third as much as the former wooden case.

The use of plastic models in developing and perfecting a device include transparent working models for visual studies of functional and structural elements, inexpensive models for experimental tests, and photoelastic resin models for stress analysis (234). A transparent working model for demonstration purposes is also a powerful selling aid. Acrylic plastic is being used to construct models whose diversity ranges from washing machines to coin-operated mechanisms, contour saws, refrigerator units, electronic steak machines, taxicab meters, office filing cabinets, automobiles, and vacuum cleaners (235, 236). Scale models of automobiles, airplanes, vacuum cleaners, etc., are also useful for engineering and sales work and as toys and novelties (237-240).

A progress report on synthetic monofilaments revealed that six different plastics—saran, polyethylene, nylon, polystyrene, vinyl, and casein—are in production to make upholstery fabrics, seat covers, insect screening, brush bristles, fishing lines, and the like (241). Developments in synthetic fibers (242), resin treatments of fibers (243), and films and coated fabrics (19-27) were reviewed. Unique applications of resin-coated fabrics included carpeting made by deep-embossed calendering of clear polyvinyl chloride over colored or printed fabric (244) and a 437-lb. vinyl resin-coated fabric liner for a portable exhibition pool for indoor aquatics (245). Transparent flexible films continued to expand their field of utility in the packaging of meats, fruits, and vegetables (246-249). Vinyl films and coated fabrics are finding a multitude of applications, along with a variety of molded plastic accessories, in catering to the needs of the nursery population of the United States for clothing, bathing, feeding, sleeping, and traveling (250).

Significant contributions of synthetic resins to the solution of difficult problems confronted by coatings and adhesives engineers have placed these two industries among the large consumers of plastic materials. Advances in protective coating materials were reviewed by several authors (251-255). Special topics considered included coatings for metal (256), glass (257), and wire (258), strippable finishes (259-261), luminescent pigments (262), and fire-retardant compositions (263). The results of investigations of the fundamental aspects of adhesion were reported in a noteworthy group of papers (264-270). Other authors dealt with adhesives and bonding techniques for use with wood (271-273), phenolic laminates (274), phenolic-to-brass (275), and miscellaneous materials (276).

Properties, Testing, Specifications

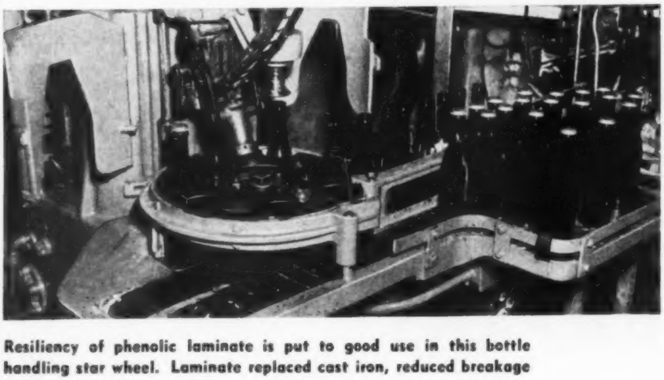
The decade just past was distinguished as a period in which concerted efforts were made to obtain and organize a background of knowledge concerning the fundamental molecular and engineering properties and performance of plastics. The year 1949 has witnessed substantial new contributions to this fund of information. It can be expected that the momentum gained by this stimulation of interest in research in this field will lead to an even greater literature on the subject during the '50s. The better understanding of and improvement in plastic materials promoted by these studies will be an important factor in the expansion of their present outlets and their entrance into new markets.

There were many outstanding reports on the mechanical properties of plastics during the past year. Some of these dealt with polyethylene (277, 278), polyvinyl chloride (279, 280), polystyrene (281-284), molded thermosets (285), and laminates (286-289). Others were concerned with specific properties, such as impact strength (290, 291), flexural strength (292), stiffness (293, 294), bearing strength (295), tensile stress-strain characteristics (296-299), cap torque strength (300), abrasion resistance (301), hardness (302, 303), and slipperiness (304). Significant additions were made to our knowledge of the thermal (305-310), rheological (311-315), optical (316-321), electrical (322, 323), water vapor and gas permeability (324-328), water absorption (329), chemical resistance (330), fungus resistance (331), and permanence (332-339) properties of plastics. Surveys of the properties of plastics were published (340, 341). Detailed data concerning plastic materials, low pressure laminating resins, films, fibers, plasticizers, solvents, laminates, adhesives, synthetic rubbers, and coatings were made available in tabulated form (342).

Recent developments in the analysis and identification of resins (343), coatings (344, 345), and synthetic rubbers (346) were reported. Specific methods were described for the determination of chlorine (347), diethyl phthalate (348), styrene (349), and extent of polymerization of acrylic resins (350). The preparation (351) and evaluation (352) of protective coating films were dealt with by other authors. Special studies were made of the solubilities of polystyrene (353) and polyvinyl chloride (354).

Investigators studying the molecular and mechanical characteristics of high polymers made use of a variety of techniques, including light scattering (355-358), dilatometry (359), viscometry (360-363), osmometry (364), electron microscopy (365), mass spectrometry (366-368), electromagnetic transducers (369), and isotopes (370, 371). There were numerous other reports of fundamental research on the molecular structure of polymers (372-375) and their behavior in solution (376, 377).

(*Continued on page 265*)



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The American Society for Testing Materials revised its specifications for phenolic, polystyrene, and urea-formaldehyde molding compounds and laminated thermosetting materials (378). New test methods were adopted for tear resistance of plastic film and sheeting (D 1004-49T), tensile properties of thin plastic sheets and films (D 882-49T), haze and luminous transmittance of transparent plastics (D 1003-49T), changes in linear dimensions of plastics (D 1042-49T), stiffness properties of non-rigid plastics as a function of temperature by means of a torsional test (D 1043-49T), resistance of transparent plastics to surface abrasion (D 1044-49T), and sampling and testing plasticizers used in plastics (D 1045-49T). Various terms and nomenclature relating to plastics were defined (D 883-49T) and recommended practices were approved for transfer molding of specimens of phenolic materials (D 1046-49T), maintaining constant relative humidity by means of aqueous solutions (D 1041-49T), and description of form of specimen and direction of testing plastics (D 1009-49T). Committee D-14 on Adhesives (379) has adopted new test methods for strength properties of adhesives in shear by tension loading of metal-to-metal specimens (D 1002-49T) and cleavage strength of metal-to-metal adhesives (D 1062-49T).

An integrated program of professional engineering education in plastics was outlined, together with a description of the types of professional engineers required in the industry (380, 381).

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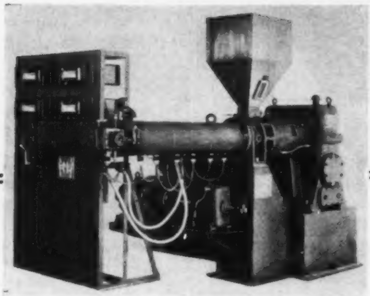

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NEWS AND INTERPRETATIONS OF THE NEWS

By R. L. VAN BOSKIRK

Plaskon Adds Three Resins to Diversify Its Line

GROWING indication of its intent to effect diversification in the production of plastics, resins, and industrial chemicals is shown by the announcement from Plaskon Div., Libbey-Owens-Ford Glass Co. of three new products. Another alkyd molding material, a phenolic abrasive binder, and a urea-melamine-type wet-strength resin for paper comprise the list.

The new alkyd material can be molded into finished form at pressures as low as 50 p.s.i. For demonstration purposes, the material can be molded by hand and cured to a hard, heat-resistant solid by brief heating. On a production basis, lightweight, fast-acting hydraulic or air-actuated presses are employed. Named Alkyd 411, the material is particularly suited to applications where a shell of plastic must be molded around delicate electrical assemblies which would be crushed by the high pressures necessary to mold other plastics. A typical use of the new compound is in electrical capacitors and resistors.

The new Plaskon alkyd is supplied to molders in bulk as a putty. At room temperatures it is readily extruded into ribbons or other required shapes which are then cut into individual pieces which serve as mold charges. This technique permits molders to pre-assemble a condenser or capacitor just before molding and to produce an integral piece with all components, including wire leads, sealed into one unit.

Mechanical and electrical properties of Plaskon Alkyd 411 are similar to those of granular alkyd. The new compound, however, has somewhat shorter storage life.

Abrasive binder—A phenolic quick-curing abrasive binder is another new Plaskon material. It is recommended for sandpapers where it is claimed to yield bond strength equivalent to presently used phenolic resins but provides more rapid setting. The quick-setting feature eliminates much of the festooning previously required to cure the bond.

Wet-strength paper—A new paper wet-strengthening resin has also been announced by Plaskon. The new resin, though neither a straight urea nor a melamine, is chemically related to both. It is described by the company as an aminoplast. The resin is now being successfully used in paper draperies, diaper stock, Kraft bags, delicatessen and butcher papers, and toweling.

The Armed Services Meeting

SUPER plastics that will perform miraculous feats is the kind of Christmas present the Armed Forces would like to have had last year or any year. To paraphrase the remarks of one technologist: "We can ask for what seems impossible and see what happens even if we don't expect to get it." But Dr. Lucius Gilman of Army Ordnance was quick to answer that if the impossible was impossible, they would take what was available and seek to build their program around the best possible materials and equipment at hand.

The above observations were drawn from the recent Washington, D. C., meeting sponsored by The Society of the Plastics Industry where its members and representatives of the Armed Forces met to discuss development projects in plastics. The meeting served well for the usual purpose of a convention—where men gather to trade information by personal contact—but critics indicated that, with a few notable exceptions, the general sessions were considered a bit less than sensational.

Much of the material given from the rostrum was information that has been hashed over in speeches and printed matter several times in the last year and a half. A great deal more was too technical for a cross-section audience and not technical enough for the experts. Many subjects dealt with raw materials almost exclusively in a fashion not particularly illuminating to a fabricator or molder.

The point we would like to make is that if the general meetings had been divided into small group gatherings where those with the same interests could get together and exchange knowledge, the conclave would have been more productive. Scarcely any molder gives a hang about coated fabrics, nor does a potential extruder of vinyl or polyethylene gun covers give a hoot about the types and proportions of organic alcohols and acids used in alkyd-di-isocyanate compounds for expanded plastics.

Perhaps we belabor the point, but we can't forget the Reinforced Plastics meeting with many of these same Government folks in Washington in 1948 which was a real humdinger, largely because everyone was interested in the same subject. What's needed is a good plan for making small group meetings at plastics conventions workable and effective; the hoary old pattern now in vogue is outmoded.

It is also possible that some golden opportunities for enlightenment of the plastics industry were missed. Several subjects are sufficiently involved to require lengthier presentation and a panel discussion. Among the topics which would require this sort of handling would be Government Specifications. There are 20,000 of them covering a wide variety of materials and a number of systems of control. It is obviously impossible to initiate an audience thoroughly into this subject in the time which was available.

An educational session in which both Government and industry representatives could throw ideas back and forth across the table on what specs ought to contain; how they are drawn up; and how to read them, should ring a bell at most any plastics meeting.

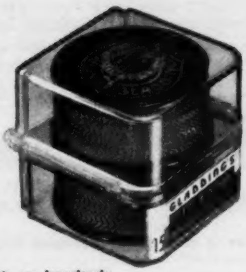
Another idea suggested along the same line would have been a session on Development Contracts. There are scores of companies today who shy away from such contracts because they have no great yen to do government business, dislike the red tape involved, often make little or no profit, and frequently lose the job to another molder after they have done all the development work. A chance for the industry

"designed right—in the right plastic"

CUSTOM MOLDERS' KNOW-HOW plus STYRON

solves another production problem!

ANOTHER CUSTOM MOLDING CASE HISTORY

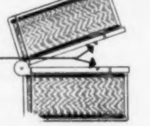


Styron is highly economical for mass production of identical pieces.

Name of manufacturer is molded into the slide cover for continued company identification.

Air vents are ingeniously designed into cover to give re-usable value as compact live bait box.

Excellent dimensional stability of Styron gives this box a tight-fitting, sliding cover that maintains close tolerances.



Two pins on cover are precisely molded to fit into corresponding holes—holding two boxes together when folded.

Styron permits precise molding of hinges that snap together securely without metal parts. Two boxes are easily separated at hinges into individual units.

Fish Line Box molded by Westplex Corporation, Rochester, New York for B. F. Gladding & Co., Inc., South Otselic, New York.

Let the expert designing know-how of the custom molder solve your difficult fabrication problems quickly and economically. His judicious selection of the right plastic from a wide range of Styron (Dow polystyrene) formulations will give you more pieces per dollar spent.

Extensive design and engineering facilities are maintained by the custom molder to serve you competently. Staffed by technicians with long experience in plastics engineering, these facilities furnish you with first-hand information on the properties and performance of various plastic materials.

Close technical cooperation between The Dow Chemical Company and Custom Molders helps you to utilize Dow plastics to the best advantage in your products. Write Dow today and let us put you in touch with a qualified custom molder, who can solve your problem.

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and government men to discuss this subject in considerable detail could be an important step towards improving this country's Defense Program. It is no secret that the government frequently has trouble placing development contracts for items that are sorely needed.

Despite the above criticisms, it would be unfair to deny that many interesting ideas were revealed or reiterated at this meeting. The criticisms, rather, center around the idea that much of the information given out was not pointed enough for the audience that was present.

For the benefit of our readers who were not there, a few of the plastics items in which the government services are interested are listed in the accompanying panel.

Table Talk

THERE were lots of crumbs to be picked up around the tables at the Armed Services meeting reported above, but there is so much "guff" and so much restricted information that it is difficult to sort out the solid from the foam. No one seems to know how much of the $13,000,000,000 defense budget is going for material but, outside of airplanes, it isn't reasonable to believe that many dollars can be left after maintenance and support of the present setup is taken care of. There is something like $600,000,000 a year available for research and development, and a fair portion is certainly going into plastics. Then there are those polyester breadbaskets—50,000 of them at over $8.00 each (something over $400,000)—a nice shot-in-the-arm for the polyester business.

On the other hand, the Army has bought only 300,000 raincoats since the war—has enough coated fabric for tents, tarpaulins, etc., on hand to last for years. Arms for the North Atlantic Pact countries will probably come largely from old stock piles, but they will get some brand new stuff too—may be some plastics involved.

It's no secret that big interest and potential big volume are in jets, missiles, proximity fuses, and other such destructive instruments. Plastics with unusual properties for heat and cold resistance as well as strength are required. There will probably be surprising results within a few years although seemingly impossible properties are demanded.

One particularly tremendous demand in war time would be mass-produced laminates to be formed in unusually large and peculiar shapes. A huge, mass production machine that could handle this kind of work is even more important than new resins.

Indications are that the Services would like to see the entire plastics industry equipped with machinery capable of turning out bigger pieces. Many of the pieces projected would weigh at least 125 lb.—some might go to 300 pounds.

In resins there seems to be a resurgence of interest in phenolics—not the old-time phenolics, but new ones with emphasis on high heat and toughness. Plenty of interest is expressed in silicones, fluoroethylenes, and nylon, but largely for gasketing, coating, and electrical purposes where high heat is involved.

Lots of talk by Service technicians centers around expanded plastics, but there is little apparent satisfaction with present materials. Eyebrows were lifted at repeated reference to use of cellular cellulose acetate. Producer has stopped producing and has sold process and equipment to Aircraft Specialties Inc., Hicksville, L. I.

Chief reason for the interest in plastics is because they are non-conductors. But a new competitor is in the offing. Armed Services are ga-ga over titanium metal which is non-magnetic, highly heat resistant, only slightly heavier than aluminum, strong enough for armor plate, and non-corrosive even in sea water.

Another quite different approach is in research directed towards use

What the Armed Forces Want in Plastics

A protective shield to deflect the blast and gases from a gun.

Polyethylene coated thin paper or fabric for use as an igniter in artillery ammunition.

A desiccant container to meet all temperature ranges, and of *high moisture permeability*.

A method of construction for putting ends on glass base tubing so as to obtain high resistance to internal pressure.

Better transparent curtain material for jeeps—acetate is too brittle at the low temperatures required.

A method to determine when polyethylene has been properly heat sealed.

Extruded acetate tubing in wall thickness of from ⅛ to ¼ in. and diameters of from 4 to 10 inches.

An adhesive that can be unstuck.

An airplane landing mat that will take 170 p.s.i., weigh 3 lb. per sq ft., and take from —70 to 180° F.

Woven glass sheets 20 ft. wide for treating with polyester resin to make convolutely wound pipe.

Heat-sealed camouflage net.

Resin-bonded glass wallboard, plumbing, fixtures, bunks, etc.

A high speed method for enclosing fibers.

Inhibitor strips not affected by low temperature.

A plastic foam plug for shell caps.

High shock-resistant water container that can be dropped.

Stronger joints when plastics are joined to other materials.

Plastics with the same degree of expansion as metal.

Better potting compounds that will keep tubes and connectors from being jarred.

Better heat-resistant, transparent inner layer for glass laminates.

Plastics that won't permit passage of ultra-violet light into planes. It burns plane occupants. Chlorinated acrylic tried but experience limited.

A coated fabric with half the weight of rubber coating but twice the strength.

The quartermaster wants polyester field desks, typewriter cases, furniture, helmets, liquid containers, refuse containers, caskets, and portable shelters. Has already let contracts for polyester ski rings, trays, pack-racks, tropical helmets, snowshoes, sleds, bread boxes, foot lockers.

All sorts of airplane applications, but most of them highly specialized. The most satisfactory way to find out about the need is to go directly to the plastics groups in the Air Branches.

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of abundant rather than scarce materials. For example, coated nylon raincoats and ponchos are wonderful, but there would probably be insufficient nylon for such uses in wartime—it would be needed for parachutes, tents, etc. So researchers are working on other fabrics. Same thing with plasticizers. Since there might not be enough phthalate plasticizers, research is directed to use of fatty acid plasticizers that can be made fungus proof.

Relief Maps

A PLASTIC relief map of Venezuela weighing only 2 lb., although its size is 45 by 56 in., is being used as a public relations aid by the Creole Petroleum Corp. The oil company will distribute 1000 of the maps in Venezuela.

These new relief maps, manufactured by Aero Service Corp., Philadelphia, Pa., were pre-printed in nine different colors, eliminating expensive hand work. They can be mounted on the wall with a few thumb tacks.

Similar maps can be produced in quantity within a $20 to $25 price range, a fraction of the cost of plaster relief maps. The lightweight models can be shipped by air, while 1000 plaster maps of similar size would weigh over 100 tons.

The maps are made by forming thin, flat, white vinyl sheets under heat and pressure. Since the war, the Philadelphia company has made several thousand 17 by 22 in. plastic relief maps representing typical geologic formations. This work earned for the company an award in the Seventh MODERN PLASTICS Competition.

Embossing Equipment

RECOVERY of the Dornbusch library of 30,000 original grains and designs has been announced by F. A. Ringler Co., 42 Park Place, New York, N. Y. The graining patterns are used for applying textures and sculptured effects on fabric, leather, paper, rubber, and plastics.

The Dornbusch grain-pattern factory was destroyed by Allied bombing during World War II, but the complete library of 30,000 grains has been found and made available to embossers by Ringler.

Sample swatches are available to manufacturers to show the patterns that may be obtained in either engraved steel rolls or electro-steel plates for regular or low pressure embossing of polyvinyl chloride.

The newest Dornbusch developments, a radically designed and highly efficient new roller-embossing machine, and a combination calender and printer that grains, tips, or inlays, will soon be on exhibit for examination by customers who may be interested in purchasing similar equipment.

S.P.I. Reinforced Plastics Division

THE Fifth Annual Technical Session and Exhibit of the Reinforced Plastics Div. of The Society of the Plastics Industry, Inc., will be held in the Hotel Cleveland, Cleveland, Ohio, on Jan. 10 through 12, 1950. The non-commercial exhibit in connection with the technical sessions will feature new applications of reinforced plastics. Approximately 50 molders, laminators, fabricators, and raw material producers will participate in the exhibit, and will conduct a display and demonstration of typical examples of their latest developments.

Seat Cover Sales Promotion

SALES of saran seat-covers for automobiles approached half the entire market in 1949, according to officials of National Plastics Products Co. and The Dow Chemical Co. Three years ago these covers had captured only 15% of this large and expanding market.

The two companies recently held a joint meeting in New York with their customers (weavers and distributors) to talk over their promotional program for 1950, when they expect sales to show increasing strength. The meeting was devoted to coordination and explanation of plans so that every sales effort made by producer, weaver, manufacturer, distributor, and retailer will contribute to the benefit of the entire saran-screen and seat-cover industry. It was completely "different" from any sales meeting that this observer has been privileged to attend.

The basis of the program is "integration." That word has been so overworked in discussing this country's ECA program in Europe that few persons understand its meaning. Insofar as National Plastics and Dow are concerned, it means weaving all the loose ends together so that there will be a united whole. In conjunction with their customers (saran weavers), these two companies will spend over $1,000,000 in 1950 for promoting sales of saran screens and seat covers. They aim to see that none of those dollars are wasted. They are prodding their customers to make sure that national advertising is followed up with advertising in local newspapers, car and window cards, decorative containers, radio, and every other possible medium. Even local telephone listings have been provided for under "saran" in the classified section. The point of final sale is emphasized over and over again.

The motivating machinery is an annual meeting called by National Plastics and Dow each Fall. It lasts a full week. Saran weavers are invited and an act provided. This year the act might have been called "A day in the life of a man who is about to buy automobile seat covers." Such an act could be disgustingly "corny" if not properly handled, but this one was good. After the act, the customer confers intimately with his suppliers concerning all the angles or questions he may have — it is practically impossible for him to leave without a thorough knowledge of the promotion campaign and how he can use it for his own profit. Among other things, he learns that this million-dollar advertising campaign certainly ought to outshine all other seat-cover advertising, where less than $100,000 is spent. Only $66,000 is spent for auto-radio advertising. Less than $400,000 is spent for advertising all the other various accoutrements that go inside an automobile. He learns that the industry is doing a policing job to prevent unfit material from getting to market. He has a chance to voice his opinion on the type of appeal that advertising should contain. The customer is made to feel that his opinions and ideas are sought and will be followed when possible.

Sure—Dow and National want to sell saran; but they are also dead sure that their customers won't remain as such unless they, too, can sell saran. The idea is to make certain that no useful effort towards that end is wasted.

Plastic Industry Review

THE review article carrying production statistics for the plastics industry generally appears in this magazine in January of each year. The 1949 review, however, will be printed in the February issue. The delay is due largely to an inability to arrive at reasonable estimates at

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a time when production of benzol and other coal-tar chemicals required by the plastics industry is still reacting to the recent coal and steel strikes.

Rotogravure on Vinyl

THE adoption of rotogravure printing to vinyl film and the fine quality results obtained were demonstrated recently by Susquehanna Mills, Inc., 404 Fourth Ave., New York, N. Y. The company has applied this method of multi-color rotogravure printing on Bakelite Corp.'s Vinylite plastics, with the assertion that every tone and hue that can be captured by natural color photography is reproduced with unsurpassed fidelity.

The color photography used in designing Suskana Prints is done in Susquehanna's own studios from natural flowers and fruits, and from authentic fabrics, paintings, and objets d'art.

It is Susquehanna's belief that this process will open up many new fields of textile design for vinyl film. The use of rotogravure for multicolor results makes it possible to reproduce subjects such as the Currier & Ives' "New England Winter Scene" and an authentic Scotch plaid with its fine detail of weave and color.

Because of the high speed of rotogravure equipment, large volume production permits the printed film to be marketed at low cost. Suskana Prints are now being sold nationally through such chain stores as J. C. Penney, F. W. Woolworth, S. H. Kress, and through leading department stores, including R. H. Macy, Gimbel's, and Goldblatt's.

Teflon Easier to Process

WIDESPREAD use of Teflon tetrafluoroethylene resin has been held up by difficulties encountered in fabricating. The very properties that endowed it with great potential industrial value—outstanding heat and chemical resistance—made it difficult to work into readily usable forms.

Du Pont chemists realized that fabrication difficulties were lessened as the granules were made smaller —and recently discovered that the material could be made as a suspensoid. In this form the Teflon particles are so fine that they remain suspended in the carrying liquid for considerable periods of time.

Teflon suspensoid ranges from 35 to 65% by weight. Using the suspensoid as raw material, chemists developed spray finishes that made it possible to give chemical tanks a tough Teflon lining; enamels for insulating fine electric wire; compounds for extruding heavier insulation onto wire; unsupported Teflon film and tapes superior to those previously available; and Teflon-coated glass fabrics and tapes.

The spray-coated finishes will adhere to metals, glass (after sandblasting), porcelain, and brick. In general, four to six coats will give protection against the more corrosive chemicals.

A motor or transformer insulated with Teflon may be operated continuously at from 400 to 500° F. By insulating with Teflon, the horsepower output of a motor can be increased substantially, or the size of the motor can be reduced and the same output obtained.

Heavier insulation — Extrusion compounds of Teflon have been developed for producing heavier insulation than is possible with the wire enamels. Coatings ranging in thickness from 5 to 20 mils have been applied to wire, in the laboratory, by use of a ram extruder. Compounds may be extruded at rates up to 20 ft. a minute.

The new forms of Teflon tetrafluoroethylene resin are available in experimental quantities at the following development prices: Spray finishes—$65 to $85 a gallon (one gallon will cover about 300 sq. ft. with a 1-mil coat); wire enamels—$75 to $110 a gallon; raw suspensoid —$10 per lb. of solids or approximately $60 per gal. of suspensoid.

I.C.I.—Solvay Agreement

FORMED in Belgium by Solvay and Co. in association with Imperial Chemical Industries, Ltd., is a new company to manufacture vinyl chloride monomer and polyvinyl chloride and its primary derivatives, including latex, pastes, and extrusion and molding compounds. The Belgian company is known as Solvic S. A., and the trade name "Solvic" is used to describe its P.V.C. products. Vinyl chloride monomer and polymer plants, using I.C.I. processes, have been built on a part of the Solvay Works at Jemeppe-sur-Sambre. Until the full I.C.I. range of P.V.C. polymers and primary products are made at Jemeppe, Solvic S. A. will be able to draw on I.C.I. for supplementary supplies.

Director of Solvic S. A. is M. Léon Flamache, who has been general research manager in Solvay and Co. for many years.

Vinyl Plus Polyethylene

A NEW Farrel-Birmingham calender that will produce a 72-in. film, plus additional printing equipment, has been installed by Presto Plastic Products Co., Inc., in its Brooklyn, N. Y., plant.

In addition to its new vinyl-film capacity, the company has installed equipment for producing polyethylene film up to 96 in. wide. The trade name will be "Poly-tex."

This is the first vinyl-film producer we have on record who has announced his intention to enter the polyethylene film field. Installation of new equipment is made possible by an addition to the present plant which now contains 197,700 sq. ft. of floor space in comparison to its former 25,200.

Presto Plastic Products Co. is an affiliate of J. P. Frank & Co., with offices at 40 Worth St., New York, N. Y.

Plastic Surface Cleaner

POLYSTYRENE surfaces may be cleaned of unwanted lacquer, grease stains, mold lubricants, and foreign matter with a new liquid cleaner called Poly-Kleen, according to Schwartz Chemical Co., Inc., 326 W. 70th St., New York 23, N. Y., which recently introduced the nontoxic cleaning compound. It is said to be more effective than time-consuming soap-and-water cleaning methods and is described as considerably more efficient than ordinary solvents which may have a tendency to craze the surface of polystyrene. The cleaner is available in 1- and 5-gal. cans.

Booths for Exposition

AS a service for the smaller exhibitors at the 1950 National Plastics Exposition at Navy Pier in Chicago, March 28-31, a complete pre-fabricated packaged booth has been developed by the Exposition Committee of the Society of the Plastics Industry. For one over-all rental price, the exhibitors will obtain a complete booth, including shipment to its spot in the exhibition hall and return.

The plywood booths, equipped

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with plastic nameplates, fluorescent lighting, closed storage cabinets, shadow box displays, and advertising panels, are available in two sizes for 10- and 15-ft. spaces.

Service Price for Coloring

A NEW polystyrene coloring service charge of 4½¢ per lb. in quantities exceeding 20,000 lb. of a standard or special color has been announced by Gering Products, Inc., Kenilworth, N. J. The finished material is delivered to the customers as an internally-lubricated, dust-free, pellet-form molding powder. The reduced service charge results in a total overall cost for colored polystyrene of 30¢ per pound.

The company has just completed expansion of its custom-coloring department for polystyrene, polyethylene, cellulose acetate, ethyl cellulose, and vinyl. A number of new types of compounding machines and allied equipment have been put into service.

The production of packaging, tubing, rods, and sheets from thermoplastics has also been substantially stepped up. Relocation of other departments has enabled Gering to devote one of its larger structures to production in these fields.

COMPANY NEWS

Plax Corp., Hartford, Conn., has appointed four sales agents to handle distribution of its Plaxpak polyethylene bottles. Covering metropolitan New York is **J. Rabinowitz and Sons, Inc.**, Brooklyn, N. Y.; metropolitan Philadelphia, **Zuckerman-Honickman, Inc.**, Philadelphia, Pa.; Chicago area, **Continental Glass Co.**, Chicago, Ill.; and metropolitan Boston, **S. H. Ansel and Sons**, South Boston, Mass.

Irvington Varnish and Insulator Co., Irvington 11, N. J., is producing continuous rolls of polyethylene sheeting of 18-in. width in all gages from 0.004 to 0.1 inch. The sheeting may be fabricated, die-cut, formed or drawn, and heat sealed by electronic or welding techniques, and is marketed under the name Ivithene.

Adamson United Co., Akron, Ohio, has recently installed a new G & L Mill particularly adapted to handling heavy housings for calenders and mills intended for use in the manufacture of vinyl film. The company points out that requirements for accuracy in rolling 0.004 in. film are much greater than in similar equipment for rubber.

Plastic Processing Co., Inc., 2210 S. Dort Hwy., Flint 1, Mich., has established a sales division in Detroit, Mich., at 260 E. Vernor Hwy., with **Albert Chicorel** in charge. The sales division will sell and develop new plastics applications and will be known as the **United State Products Co.**

Announced at the same time was the association of **Robert M. Gubbins** with the firm as vice-president in charge of production. Mr. Gubbins was formerly with the plastics division of General Motors Corp.

Duke Mfg. Co., Inc., manufacturer of Little Duke plastic baby trainers and Ever-Nu plastic seats, has merged its previous New York and New Jersey manufacturing facilities and executive offices into a new plant at 2200 Urbanowitz Ave., Linden, N. J., with increased production capacity and added administrative personnel. **M. Schier** has been promoted from purchasing agent to general sales manager but will also continue to supervise purchasing.

Continental Can Co., Inc., has announced appointments in its Plastics Div. located in Cambridge, Ohio, of **Dorward C. Witzke**, formerly assistant to the president, as general manager, and **Alex Geldhof** as product sales manager of industrial laminates.

Noma Electric Corp. has announced the following changes in the management of its Plastics Div. at Holyoke, Mass. **George J. Wexler**, formerly manager of the Decorative Lighting Div., is now general manager of both the Plastics and Decorative Lighting Divisions. **Richard J. Plichta** has been made superintendent of the Molding Dept., and **George W. Martin** has been made superintendent of Tools and Engineering.

Rogers Corp., Manchester, Conn., has announced a change in designation for its new medium high-impact phenolic molding compound. Introduced recently under the name Luron, these nodular molding materials now carry the designation Rogers RX 400 series.

Schwartz Chemical Co., Inc., 326-328 W. 70th St., New York 23, N. Y., has added the **L. A. Weil Co.**, 53 Park Pl., New York, to its list of distributors handling plastic lacquers, enamels, and related products. The company reports that additional distributors will soon be selected in major U. S. cities.

Sterling Injection Molding Co., 277 Military Rd., Buffalo 7, N. Y., has been dissolved, and its manufacturing assets have been purchased by a new corporation, **Sterling Molders, Inc.**

Eldon Manufacturing Co., compression and injection molder of 1010 E. 62nd St., Los Angeles, Calif., has added 18,000 sq. ft. additional space to its present facilities.

The Carpenter Steel Co., Reading, Pa., has appointed **Omar V. Greene** as New England sales manager, with headquarters in Hartford, Conn. Mr. Greene succeeds **Wynn F. Rossiter**, who has been made assistant to the vice president and will devote his time to special operations. **John W. Thompson**, who was formerly manager of alloy steel sales, has been named manager of sales development to succeed Mr. Greene in this capacity at the company's main office in Reading.

R. S. Aries & Associates, 26 Court St., Brooklyn, N. Y., chemical engineer and economist, has started publication of a house organ called *Chemonomics*, which is designed to carry information particularly appropriate to the field of chemical economics.

The company has also announced opening of a branch office in Stockholm, Sweden, with **Sven Telenius** in charge.

Interchemical Corp. has moved its **International Printing Ink and In-tag Divs.** to temporary new quarters at 650 11th Ave., New York 19, N. Y., while final plans are being completed for housing of these two divisions. The IPI New York Sales Branch and Service Station remains at 636 11th Ave.

IPI recently began occupation of its new $2,500,000 factory in Elizabeth, N. J. Other factory expansion programs have been completed in Chicago, Ill., Battle Creek, Mich., Philadelphia, Pa., Atlanta, Ga., and Los Angeles, Calif.

St. Regis Paper Co., Panelyte Div., 230 Park Ave., New York 17, N. Y., has announced the organization of

THE PLASTISCOPE

a new advanced engineering department to be headed by **Robert W. Barber**, Trenton, N. J.

Mr. Barber has been chief engineer of Panelyte and has taken active part in developing the company's complete lines of plastics for industrial and refrigeration applications. Succeeding him as chief engineer is **George E. Vybiral**, Trenton, who has served as Mr. Barber's assistant.

Lester, Hankins and Silver has been organized as a management engineering firm by **Bernard Lester, Frank W. Hankins,** and **John A. Silver.** Mr. Silver was formerly director and executive vice-president of the F. J. Stokes Machine Co. Mr. Lester was with the Westinghouse Electric Corp. as assistant manager of industrial sales; Mr. Hankins has headed the marketing counselling firms of Frank W. Hankins and Hankins Borie and Associates. The firm, which will specialize in the management, distribution, and sales problems of manufacturers and distributors of machinery, equipment, and technical products, has offices at 1605 Race St., Philadelphia, Pa., and 140 Cedar St., New York, N. Y.

Modglin Co., Inc., 3235 San Fernando Rd., Los Angeles 41, Calif., has announced that its president, **W. N. Modglin**, and **Mrs. A. Lois Modglin**, vice-president in charge of product design, have been on tour to explore the possibility of extending company manufacturing operations to foreign countries. Included in the Modglins' itinerary were stops at Nassau and San Juan, Puerto Rico, to study the possible establishment of a branch manufacturing location in Puerto Rico.

The company expects a sales increase of $500,000 in 1950 for its household brooms. Net earnings on 209,050 outstanding shares of common stock for April through September of 1949 totaled $49,649.08, as compared with net earnings of $46,392.08 in the same period of 1948.

The newest Modglin product, Permene bristles for rotary street-sweeping equipment, has received certain state, city, and federal acceptance and has shown a high degree of sales promise.

Electronic Engineering Corp., 624 Ridge Rd., Lyndhurst, N. J., manufacturer of dielectric and induction heating equipment, **has formed** an Engineering Projects Div., which is composed of a team of one electrical engineer, one chemical engineer, and a mechanical engineer. The organization is a consulting service unit and will operate at no cost to prospective clients.

International B. F. Goodrich Co., Akron, Ohio, has reported an order for 39 miles of Koroseal upholstery material—68,640 yd.—received from a foreign manufacturer of seats for motor vehicles. The company states that this is the largest order of its kind it has ever received for this material.

Catalin Corp. of America, 1 Park Ave., New York, N. Y., has awarded a contract to the **Chemical Plants Div.** of **Blaw-Knox Co.** for the design and construction of a liquid resin plant at Calumet City, Ill. Initial plant operation is planned for March 1950.

The plant will produce liquid phenolic, urea, melamine, and resorcinol resins for laminating, bonding, glueing, impregnating, and finishing wood, plywood, furniture, textiles, paper, abrasives, filters, rock, and glass fiber insulating materials, etc.

Culpepper-Hertz, Inc., has been organized by **Frank M. Culpepper** and **Dr. David B. Hertz,** management consultants, with offices at 580 Fifth Ave., New York, N. Y.

Both Dr. Hertz and Mr. Culpepper were formerly with the **Celanese Corp. of America.**

PERSONAL NEWS

Dr. Lorin B. Sebrell, formerly of **The Goodyear Tire & Rubber Co.,** has been appointed a member of the staff of **The Firestone Tire and Rubber Co., Chemical Research Div.**

M. Scott Moulton, formerly with **B. F. Goodrich Chemical Co.,** and now located at 116 W. Pueblo St., Santa Barbara, Calif., has been in Sweden for the last month on a consulting assignment with **Molnlycke Vafveriaktiebolag** in Gothenberg. The company is engaged in the vinyl paste coating of fabrics.

Dudley B. Blake has been appointed general sales manager of **United Lacquer Mfg. Corp.,** Linden, N. J., and Everett, Mass., manufacturer of industrial finishes, synthetics, and paints.

Millard Demarest, formerly of **Plastics Div., Celanese Corp. of America,** is now sales manager of **Whiteford Plastics Co., Inc.,** 311 W. 66th St., New York, N. Y.

Harry Haaxma has been named plant manager of **Wolverine Plastics, Inc.,** Milan, Mich. He was formerly chief engineer.

B. L. Levison, company sales representative for several years, has been appointed sales promotion manager of **The Rex Corp.,** Cambridge, Mass., custom extruders of plastics.

Deceased

B. L. Batty, technical director in charge of sawdust board and adhesive development of Rock Island Millwork Co., Rock Island, Ill., died recently.

Russell T. Moore, Monsanto Chemical Co., died Nov. 19 at his home in Tenafly, N. J. He had been a sales engineer in the Plastics Div. of Monsanto since 1929.

MEETINGS

Jan. 9—Upper Midwest Section of S.P.E., 6 p.m. at Coffman Memorial Union, University of Minnesota, Minneapolis, Minn. A representative of Hercules Powder Co. will speak.

Jan. 16-19—Plant Maintenance Show, Auditorium, Cleveland.

Jan. 19—S.P.I. Boston-Providence Chapter meeting, Hotel Beaconsfield, Boston, Mass.

Feb. 13-14—Annual Meeting, S.P.I. (Canada), Royal York Hotel, Toronto, Ont.

Feb. 16—S.P.I. Boston-Providence Chapter meeting, Hotel Beaconsfield, Boston, Mass.

Feb. 27-March 3—Committee Week and Spring Meeting, American Society for Testing Materials, Hotel William Penn, Pittsburgh, Pa.

March 2-4—1950 Spring Conference, Pacific Coast Section, S.P.I., Hotel Del Coronado, San Diego, Cal.

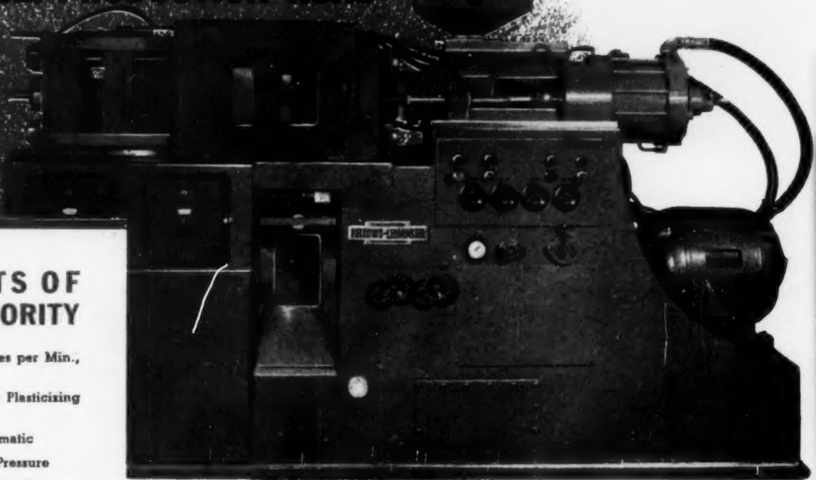
March 28-31—National Plastics Exposition, Navy Pier, Chicago, Ill.


HOT MOLDING...
made possible by F-L DESIGN !
HOT MOLDING 10 Shots per minute on a 10-cavity mold by an eastern Custom Molder.
HOT MOLDING Industrial Molders running 350 cycles per hour on 8-cavity Nylon job.
HOT MOLDING Proprietary Molder in midwest getting 10 shots of polystyrene per minute on 12-cavity pin-point gated mold.
HOT MOLDING Three machines running simultaneously with one operator in one molder's plant.
HOT MOLDING Consumer Molder with 4-cavity mold, 5/8" thick wall running on an 8-second cycle.
S...S...ZZZ...T!
Fellows
LEOMINSTER

A NEW SPEED CYCLE TECHNIQUE

1B-3

FOR 3 OZ. PRODUCTION RUNS



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1. Up to 10 to 14 Cycles per Min., "Dry-Run"
2. 45 Pounds per Hour Plasticizing Capacity
3. Machine Fully Automatic
4. 20,000 psi Injection Pressure
5. 150 Tons Mold-Clamping Pressure
6. Rapid Advance Plunger Action, plus Adjustable Stroke
7. Water-Cooled Front Platen
8. "Speed Flo" Cylinder with Taper-Tite Separator
9. Built-in Temperature Controllers
10. Centralized Mold Clamping Adjustment
11. New Open Accessibility of Hydraulic System
12. Clock Controlled Booster
13. Air Blast Ejection provided for
14. Six-digit Production Counter

HOT MOLDING...so called because the shots come so fast that cold water "quenching" is part of the technique! 6, 8 and 10 shots a minute. Think of what that means!... Here is Fellows "Speed Flo" machine design that raises production capacity 'way, 'way UP. And costs DOWN.

Full-automatic operation enables one operator to tend 3 machines, easily. Warm up is faster. So is set-up time for production runs. Clamping minimizes flash. Burning and discoloration are banished....Think what all this means in daily extra profits. Is it any wonder there's a "news story" wherever a machine goes in?...Write, wire or phone for details—from whichever office is nearest.

injection molding equipment

THE FELLOWS GEAR SHAPER CO., Plastics Machine Div.: Head Office and Export Dept., Springfield, Vermont. Branch Offices: 616 Fisher Bldg., Detroit 2. 640 West Town Office Bldg., Chicago 12 · 2206 Empire State Bldg., New York 1 · New England Distributor: Leominster Tool Co., Leominster, Mass.

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Up to 180 words	22.50
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For further information address Classified Advertising Department, MODERN PLASTICS, 122 East 42nd St., New York 17, New York

Machinery and Equipment FOR SALE

VAN DORN INJECTION PRESS—2 oz. Model H-200 except equipped with large 1" Heating Chamber for maximum efficiency. Like new. Purchased 1949 and used slightly. A-1 operating condition. Reply Box X158, Modern Plastics.

FOR SALE—Cumberland Slitting & Mangling Machine, 18", complete with motors and speed reducer. Immediate delivery. Perfect condition. Reply Box X104, Modern Plastics.

LATE TYPE INJECTION MACHINES

16 oz. HPM—Installed 1946

6 oz. Lester—Extra Heater—Installed 1939

4 oz. Reed-Prentice—New 1948

4 oz. Reed-Prentice — Extra Heater — Installed 1944

Two 4 oz. Reed-Prentice—New 1946

4 oz. HPM—Installed 1944

Two 2 oz. Reed-Prentice—Installed 1937 & 1938

Reply Box X106, Modern Plastics.

FOR SALE: Injection Presses 2, 4, 6 & 8 oz Reeds, 4 oz HPM, 6 & 8 oz Lester, 1 oz vert. NRK. Extruders: 1½", 2½" NRM, 4½" oil heat. Royle. NRM 40' conveyor. Pelletizer. Ovens, Granulators, Tumbling Barrels, Temperature Circulators. 1—Miskella Vibratordryer. Apex rd. obj. print. mach. Preco Labpress. 1—10 opn. 30 x 30" Pl. Laminat. press. 1—150 ton Stokes No. 252 automatic closure press. Pumps. 150 & 250 ton Compress. press. 2—Standard No 250A 50 ton self contd. hydr. presses. Kux No 50 single punch, Kux No 25 rot. Preformpresses. Icecube Cup & Drawerpull used. inject. molds. JUSTIN ZENNER, 833 W. Sherdan Road, Chicago 13, Ill.

6-OUNCE WATSON-STILLMAN Horizontal Injection Molding Machine available. Good operating condition. Reasonable. Reply Box X120, Modern Plastics.

FOR SALE: one 4 ounce 100 H 4 H.P.M. injection machine in perfect condition. Purchased new in 1947. Hastelloy cylinder, Micro Flex Timers, Wheelco heat controls, automatic closing device and gravity feed. Will sacrifice at $6,000.00. F.O.B. our plant. May be seen in operation. Reply Box X135, Modern Plastics.

MODERN PLASTICS reserves the right to accept, reject or censor classified copy.

EMPLOYMENT · BUSINESS OPPORTUNITIES · EQUIPMENT (used or resale only)

FOR SALE: Heavy Duty Double Arm Mixers: 2½ lb. Lab. size, 25 gal., 100 gal., and 150 gal. work capacity. Stokes rotary 16 punch pellet presses. PERRY EQUIPMENT CORP., 1529 W. Thompson St., Philadelphia 21, Pa.

SALE: Reed-Prentice 2 oz. Injection Machine, High Pressure Booster, Excellent, 1937.
Astor-Ramel Mfg. Co., Inc.
395 Brook Avenue
Bronx 54, N. Y.

SALE: Scrap Grinder Ball & Jewell Heavy Duty, 5 H.P. Motor, Excellent, 1944.
Astor-Ramel Mfg. Co., Inc.
395 Brook Avenue
Bronx 54, N. Y.

FOR SALE: 12 Krehbiel automatic button drilling machines. Used only a few hours—same as new. 1 Hydraulic accumulator, 7" ram, cylindrical tank 7' x 9'. Stroke approximately 6'. Good Condition. Reply Box X125, Modern Plastics.

16-OUNCE HPM INJECTION MOLDING MACHINE complete with hydraulic power dual circuit operating system, temperature control, and spare cylinder. Recent model. Reply Box X161, Modern Plastics.

REDUCED FOR QUICK SALE
Baker Perkins & Readco Heavy Duty 100-150 gal. Double Arm Jacketed Mixers.
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Day & Robinson 100, 600, 1000, 1200, 2400 & 4000 lbs. Dry Powder Mixers and Sifters.
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Hayssen 3-7 and Scandia SSU1 Automatic Cellophane Wrappers.
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Union Standard Equipment Co.
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FOR SALE: Miskella Vibra-Veyor. 110 Volts, including bench truck and 12 — 250 Watt lamps. In excellent condition. Price $550.00. Reply Box X146, Modern Plastics.

N.R.M. oil heated 2½ plastic extruder available now at right price for quick sale. Screw and tie adapter included. Heating unit is optional. Complete unit in excellent condition and now in operation in seller's plant. Inspection is invited. Price f.o.b. Chicago. Reply Box X151. Modern Plastics.

FOR SALE: Molding Presses 100 ton and 150 ton Stokes Standard. Also one Watson Stillman 200 ton, 12" ram. All self contained units in perfect working condition complete with timers and controls. RODALE MFG. CO., INC., Emmaus, Pa.

FOR SALE: Stromes Electric Oven. AC-DC. 1320 watts. Size: 17" x 24" x 27". Used 4 months. To 400°F. Thermostat controlled. Price: $75.00. Reply: Boruski, 505 5th Ave., New York 17.

FOR SALE: Reed-Prentice 10A-4oz. INJECTION MOLDING PRESS Mfd. Nov. 1939. Serial #16470. Complete with motor and new Bristol controls. Price $2,950.00. Write R. H. Pattison, Box 673 Hudson, New York, or telephone Hudson 8-3332.

FOR SALE: 100 Ton and 50 Ton Stokes Molding Press & Pumps; 300 Ton Dunning & Boschert, Molding Press; 300 Ton W. S. New Hobbing Press; 750 Ton Southwark Hobbing Press; 300 Ton W. S. Press 24 x 20 Platens; 175 Ton H. P. M. 30 & 30 Platens; 85 Ton Stewart Bolling 20 x 20 Platens With Electric Plates; 50 Ton 18" x 18" Elmes, With Electric Plates, Handpump Operated; 500 Ton Waterbury Farrel 3 Post Press; 800 Ton Waterbury Farrel 22" x 24" Platens; Stewart Bolling 50 Ton 14" x 14" Platens; 35 Ton Oilgear Shaft Straightener 84" Long Bed; Carver & Watson Stillman Lab. Presses; Hydro Pneumatic & other type Accumulators; Piston & Oil Pumps. AARON MACHINERY CO., 45 Crosby St., N.Y.C.

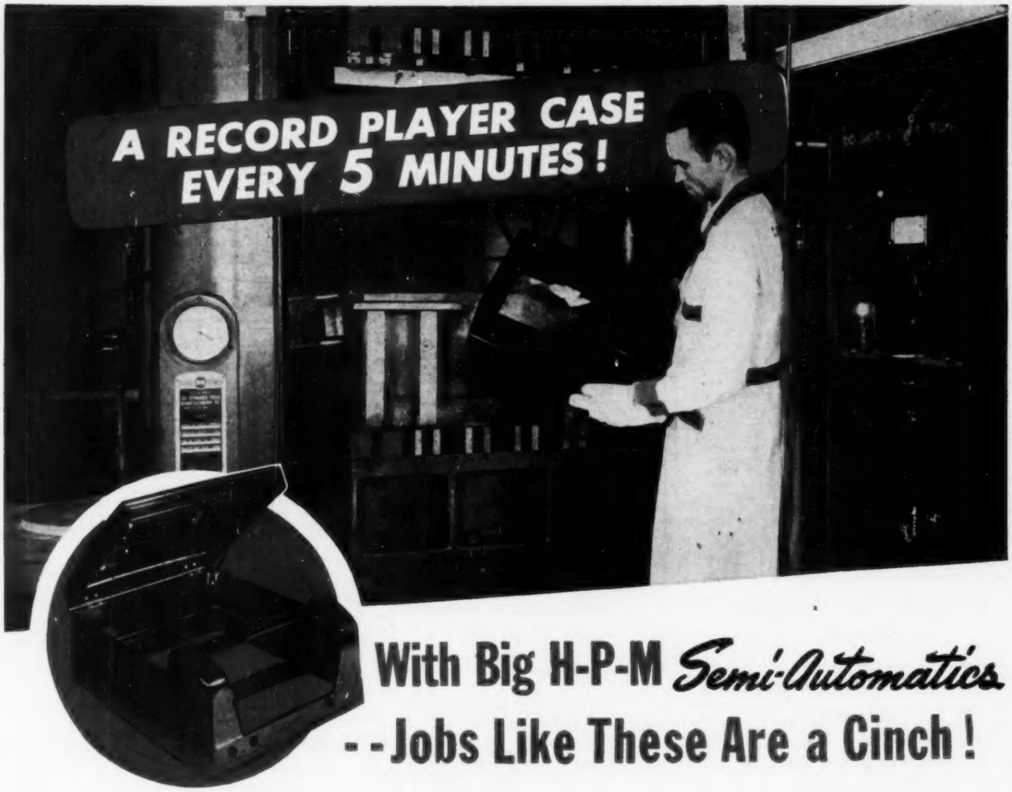
HYDRAULIC PRESSES REBUILT TO SPECIFICATIONS for plastic items, industrial purposes and phonograph record presses. We have in the used equipment (1) Baldwin-Southwark 8" x 8 ft. stroke, 2000# W. P. weighted accumulator $2000, (1) French Oil 8" x 42" stroke, 2500# W. P. weighted accumulator $600, (1) 400 ton, 32 x 45, 18" ram, 36" stroke, 12' daylight $2200, (1) 300 ton 30 x 46, 18" ram, 24" stroke, $1800, (1) 400 ton 22 x 30, 16" ram, 18" stroke, 36" daylight $1500, (2) 150 ton 42 x 46, 12" ram, 36" stroke, 60" day-light $900 each, (3) 24 x 24, 250 ton Southwark Presses with push-backs, 15½" ram, 15" stroke, 33" daylight $1450 each. Hydraulic Sal-Press Co. Inc., 386-90 Warren Street, Brooklyn 2, New York.

SAVE WITH GUARANTEED REBUILT EQUIPMENT-HYDRAULIC PRESSES: 20" x 24", 13" ram, 400 tons; 36"x36", 19" ram, 425 tons; 24"x42" 340 tons, 2-12" rams; 34"x40" 22" ram, 475 tons; 26"x24", 18½" ram, 800 tons; 24" x 24" 18" ram, 318 tons; 24" x 24", 12" ram, 170 tons; 42" x 42", 16" ram, 250 tons; 36" x 52", 14" ram, 385 tons; 30" x 36", 12" ram, 141 tons; 24" x 20", 10" ram, 118 tons; 20" x 20", 10" ram, 118 tons; 19" x 24", 10" ram, 78 tons; 22" x 15", 8" ram, 75 tons; 15"x15", 8" ram, 75 tons; 12"x12", 7½" ram, 50 tons; 12"x12", 6½" ram, 42 tons; 8"x9½", 4½" ram, 20 tons; 16"x16", 3½" ram, 12 tons; Laboratory press 30 tons 6"x6"; NEW DUAL PUMPING UNITS, ALL SIZES; Worthington Triplex 12 gal. 2200#, 4 plunger 6 gal. 2000#; Watson Stillman duplex box type 1 gal. 2500#; Worthington 1 gal. 10000#; NEW LABORATORY 6"x12" M. D. MILLS; Thropp 16" x 40" M. D. MILL; EXTRUDERS, NRM size 1½" and 2½" Units; PREFORM MACHINES; Stokes R&T, Colton 5 & 5½ T, 2 Stokes DDS 4 with Reeves Drives, Mixers, Accumulators, Vulcanizers, etc. UNIVERSAL HYDRAULIC MACHINERY COMPANY, 285 Hudson Street, New York City 13, N. Y.

FOR SALE—Used Machinery, Compression Molding Presses—Laboratory size up to 600 Tons; Injection Molding Machines—1 oz. to 22 ozs; Plastic Extruders 1" to 4½" diameter; Compounding Rolls; Scrap Grinders, Preform Machines—complete equipment for making Molding Powders and for all kinds of Plastic Molding. What do you need? CONSOLIDATED PRODUCTS CO. INC., 13-14 Park Row, New York 7, N. Y.

LAMINATING. We have a 6-opening press with an 18" ram, platten area of 26" x 41". It is set up and hooked up to steam and water lines. We also have plates, racks, pre-curing ovens, and so forth. At present we have little use for it. Would prefer to find a use for it and will entertain a hiring or partnership set up or will sell the complete unit and arrange a low lease with purchase of steam as used by meter. Plant is located in Boston. Reply Box X163, Modern Plastics.

(Continued on page 302)



With Big H-P-M *Semi-Automatics* --Jobs Like These Are a Cinch!

When the Plastics Division of Continental Can Company decided to go after "big" molding jobs, they chose a 750-ton H-P-M semi-automatic compression press. Here's why . . . H-P-Ms require a minimum of floor space. No accumulators or connecting hydraulic pipe lines are needed . . . just fill the tank with oil and connect the motor to your power line and it's ready to go to work! The compact, heavy duty H-P-M radial pump supplies **steady pressure** which can be easily and quickly adjusted. Automatic ejectors eliminate time consuming manual effort. These are just a few of the many money saving features of high speed H-P-M presses.

You, too, can step-up production and eliminate costly rejects with modern H-P-Ms. Call in a nearby H-P-M engineer today!

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Write for a free copy of Bulletin 4702 describing H-P-M compression and plunger type transfer molding presses. Stock sizes are available for quick delivery.

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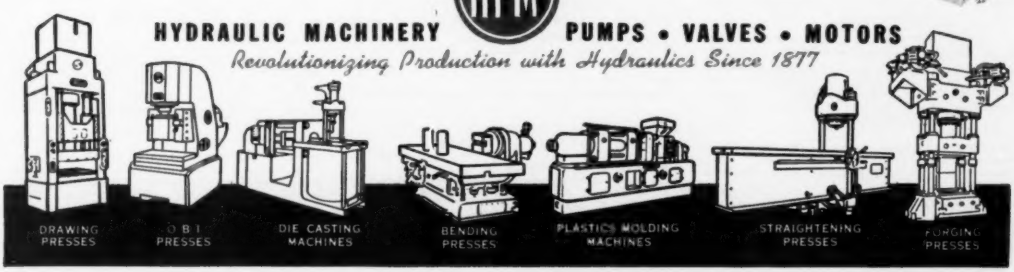
Revolutionizing Production with Hydraulics Since 1877



CLASSIFIED ADVERTISING

(*Continued from page 300*)

Machinery and Equipment FOR SALE

FOR SALE: Farrell 18" x 45", 16" x 48" & 15" x 30", 2 roll Rubber Mills. New Lab. 6" x 12". Other sizes 30" to 84". Royle #2 Perfected Extruder, and other sizes. 500 ton Hydr. Molding Press 42" x 48". Field 500 ton 25" x 30". Francis 200 tons 24" x 18". Albert 100 ton 2 opening 24" x 24". 40 ton Broaching Press. Also presses 20 to 500 tons from 12" x 12" to 36" x 36". Watson-Stillman Hor. 4 plgr. 1" x 2" x 4" H. & L. Pressure Pump. HPM 1⅝" x 6" vertical triplex 10 GPM 2700 lbs. 7 Hydr. Oil Pumps, Vickers, Oilgear, Northern, etc. Elmes 1" x 4" & 1⅛" x 4" hor. 4 plgr. 5 to 8 GPM 4500 lbs. & 5500 lbs. Elmes 2" x 6" hor. 30 GPM 2500 PSI. Rumsey 4½" x 8" vert. Triplex 65 GPM 900 lbs. Elmes 2½" x 4" hor. 17GPM 850 lbs. Hydr. Steam Pumps. Low pressure Pumps 150 to 600 lbs. Hydr. Accumulators. Stokes Automatic Molding Presses. Stokes Rotary Preform Tablet Machines 1 3/16", 1⅛" and ⅝", also single punch. Injection Molding Machines 2 oz. to 28 oz. Baker Perkins jacketed Mixers 200, 100, 50, 9 & 0.7 gals. capacity. New and used Rotary Cutters. Rubber Mills, Calenders, Banbury Mixers, etc. Heavy duty Mixers, Grinders, Pulverizers, Gas Boilers, etc. PARTIAL LISTING. WE BUY YOUR SURPLUS MACHINERY. STEIN EQUIPMENT CO., 90 WEST STREET, N. Y. 6, N. Y. WOrth 2, 5745.

Machinery and Equipment Wanted

WANTED

Equipment or small shop preferable with #3A Banbury, 2 mills and 3 roll calender.
Reply Box X111, Modern Plastics.

WANTED: 16 oz. Reed Prentice Injection Molding Machine in good condition. Reply Box X115, Modern Plastics.

WANTED: Impco VF-822-A. State price, condition, heating cylinder, when purchased, and serial number. Where can it be inspected? Reply Box X119, Modern Plastics.

WANTED: Reed Prentice 10-D6 or 10D8. Give full details and location of machine in first letter. Reply Box X118, Modern Plastics.

MACHINERY WANTED: Defiance Preform Press. Reply Box X134, Modern Plastics.

WANTED: Stokes Model #235 50-ton Automatic Molding Presses. RODALE MFG. CO., INC., Emmaus, Pa.

WANTED: INJECTION MOLDING MACHINES 6 or 8 ounce Reed-Prentice or 9 ounce H.P.M., 4 years old or less, in good operating condition. Preferably in Eastern location. Reply Box X140, Modern Plastics.

WANTED: Complete plants, also individual items such as: Mixers, grinders, 2-roll mills, extruders, etc. Reply Box X162, Modern Plastics.

#235 and #200D3 Stokes Automatic Molding Presses wanted by electrical manufacturer. Please write Box X157, Modern Plastics.

IF YOU HAVE GOOD HYDRAULIC PRESSES with modern pumping equipment for sale send me your specifications of same with photo, and I will see to it that you will get the best price available. Announcing: Hydraulic Sal-Press Co., Inc., formerly Sal's Press, located at 386-390 Warren St., Brooklyn, N. Y. Will continue to render its usual good service.

NEED IMMEDIATELY: 8-12 oz. injection molding machine. Prefer HPM or Reed-Prentice. Have 4 oz. Crown Moldmaster in excellent condition now operating in our plant. Must trade this machine and have difference financed. Have contracts on hand calling for larger press. Immediate action imperative. Plasticraft, Inc., 700 Albert Pike, Hot Springs, Arkansas.

Material For Sale

FOR SALE

Cellulose Acetate Sheets
20" x 50"
700 lbs. Clear .125
5000 lbs. Clear .150
1400 lbs. Clear .250
500 lbs. White .100
7000 lbs. Black .150
700 lbs. Black .250
1500 lbs. Shell .015

All in the original manufacturer's cases offered at 50% below list price.

A. BAMBERGER CORPORATION
44 Hewes Street, Brooklyn 11, N. Y.
Ulster 5-3887

HIGH GRADE REPROCESSED POLYSTYRENE AVAILABLE
LIGHT CLEAN COLORS similar to Bureau of Standards Shades
Excellent Molding Properties
For Prices and Samples,
Reply Box X132, Modern Plastics.

PHENOLIC TUBING FOR SALE

1000' 1⅝" OD x 1¼" ID x 36" @ $.17 ft
3000' 2" OD x 1½" ID x 36" @ $.19 ft
900' ½" OD x 5/16 ID x 36" @ $.06 ft
900' ½" OD x ¼" ID x 36" @ $.06 ft
Large quantity 5 1/16 OD x 4 9/16 ID x 9' @ $.30 ft

Reply Box X141, Modern Plastics

FOR SALE — BARGAIN

Surplus Nitrate Sheets

Approximately 100,000 Sheets .015 Cellulose Nitrate Clear 20" x 50" trimmed, first quality, packed 200 Sheets per case, price approximate 50% off list.

HYMAN DEBROVY & SONS.
326 E. Market St.
Louisville 2, Ky.
Telephone Jackson 3352

FOR SALE — BARGAIN
Approximately 300 Pink, 250 Blue Lucite Sheets 20" x 50" x .150". Also Acetate Sheets, 300 Blue, 400 Pink, 20" x 50" x .060". All at 50% off list.
E. J. McGuire—
Shuron Optical Co., Inc.
242 Andrews Street
Rochester 4, New York

Material Wanted

POLYSTYRENE SCRAP WANTED. Highest Prices paid for Reground Polystyrene. Write for Schedule to Box X131, Modern Plastics.

WANTED: PLASTIC VINYL SCRAP. All gauges, Metallic, Clear, Clear Transparent in all colors. Top prices paid. Large quantities. 1000 lbs. to carload lots. Reply Box X110, Modern Plastics.

Require for immediate purchase large quantities virgin polystyrene and butyrate molding powders in all light or transparent colors.
Dussl-Wallace and Company
60 East 42 Street
New York 17, New York

PLEXIGLAS AND LUCITE WANTED
Cut-offs and scrap. Any quantity.
Highest Prices.
Nat Yoffie—585 Washington St.,
New York 14, N. Y.
WAtkins 4-4217.

WANTED: PLASTIC Scrap or Rejects in any form. Cellulose Acetate, Butyrate, Polystyrene, Acrylic, Vinyl Resin, etc. Also wanted surplus lots of phenolic and urea molding materials. Custom grinding and magnetizing. Reply Box X156, Modern Plastics.

WANTED: Plastic Scrap. Rigid Vinyl, Cellulose Acetate, Polystyrene. Custom grinding, magnetizing and X-raying. Compounding time available. Franklin Jeffrey Corporation, 1671 McDonald Avenue, Brooklyn, N. Y. Es 5-7943

Wanted — Solvents
WASTE OR VIRGIN
Also Surplus
plasticizers—molding materials—plastics
color-pigments-waxes, etc.
CHEMICAL SERVICE CORP.
96-04 Beaver St., New York 5, N. Y.

Molds for Sale

MOLDS FOR SALE: One complete set of 4 molds for excellent quality TOTALLY ENCLOSED TOILET SEAT. Also two cavity mold for 4 inch wall tile. Please call or write—Newton Plastic Corp., Newton 58, Mass. Telephone Decatur 2-0800.

FOR SALE: Seven (7) injection molds for complete toy train set for Export only. Complete details upon request. Reply Box X150, Modern Plastics.

8 OZ. INJECTION MOLD, very slightly used, for wide attractive bracelet; a new item never offered or sold before; excellent for variety or syndicate chains as cheap jewelry or teen-ager item. Also 8 oz. injection mold for clothes-pins, millions of which were successfully sold to Woolworth, Kresge, Grant, etc. Reply Box X153, Modern Plastics.

Molds Wanted

INJECTION MOLDING COMPANY located on Eastern seaboard wishes to purchase or rent on a royalty basis molds for toy, novelty, houseware, medical and industrial items. Reply with samples to Box X106, Modern Plastics.

WANTED
Discontinued or obsolete molds in excellent condition for charms or medals. Size approximately of a twenty-five cent piece, with figures of animals, flowers, etc. In bas relief. Send several samples in different colors. Reply Box X114, Modern Plastics.

(*Continued on page 304*)

CLASSIFIED ADVERTISING

(*Continued from page 302*)

Molds Wanted

WILL PURCHASE children's or adults' used hanger molds. Also display box molds suitable for rings, watches, etc. Reply Box X126, Modern Plastics.

INJECTION MOLDS up to 12 ounces wanted by Canadian Concern on rental basis or outright purchase. Please send all particulars regarding mold, and samples of items. Reply Box X148, Modern Plastics.

WANTED: used molds for 2 oz. and 4 oz. injection plastics machines, for fine-combs, ladies' dressing combs, toys, houseware, kitchenware. Reply Box X155, Modern Plastics.

Help Wanted

EXPERIENCED PLASTIC SALESMAN to sell Injection Molding output of a reputable firm. Excellent opportunity for man with established following in the Plastic sales field. Reply Box X101, Modern Plastics.

EXTRUSION ENGINEER to take charge of plastics extrusion dept. for wire, cable, shapes and sheet matl. Must have knowledge of die design. Location: Chicago. Reply Box X105, Modern Plastics.

EXPERIENCED SALESMAN: Thermo-Plastics and Molding Powder. Age 25-30. Submit resume and salary expected with application. All inquiries will be kept confidential. Reply Box X107, Modern Plastics.

EXCEPTIONAL OPPORTUNITY open for salesman or manufacturer's representative in Middle West by one of largest custom molders. Reply Box X109, Modern Plastics.

HYDRAULIC DESIGN ENGINEER

A Middlewest company desires the services of a man thoroughly acquainted with all phase of hydraulic engineering. Must have had at least 5 years actual experience on the engineering and design of equipment, including hydraulic metal drawing, plastic molding and extrusion presses and controls.

In replying please give full details regarding your experience, background, age and approximate salary requirements.

Reply Box X113,

MODERN PLASTICS

122 East 42 Street, New York 17, NY

PLASTIC ENGINEER WANTED—Position will require man with the experience to act as assistant to chief engineer. Must be able to estimate piece parts and tool cost. Knowledge of tool design required. Give information concerning experience and salary requirements in first letter. Reply Box X122, Modern Plastics.

MANUFACTURING MANAGER

Established molder has opening for experienced plastics manufacturing man preferably with technical education. Must be able to plan, organize, and execute by selling his plan to the organization.

Give full details in reply including age, education, experience, salary and reasons for change.

Reply Box X121, Modern Plastics.

CHEMIST: Plant specializing in extrusion of clear and opaque vinyl plastic belting desires to compound their own material. Wish to start experienced person now employed in this type of work at extremely attractive salary. This is an excellent opportunity for the right man. All replies will be kept in the strictest confidence. Reply Box X124, Modern Plastics.

WANTED. GRADUATE ENGINEER with minimum of five years' experience to head Plastics Laboratory devoted to design of parts, mold design and selection of proper plastic materials. Should also have working knowledge of all phases of engineering and materials other than plastics. Excellent opportunity for advancement. Reply Box X160, Modern Plastics.

PLASTICS

SALES REPRESENTATIVES

Wanted for Eastern, Mid-West and Pacific Territories who have contacts with users of Cellulose acetate, butyrate and nitrate sheets and rods. First grade men who are interested in a permanent connection with an old-established plastic company making and marketing a better product. A good opportunity for experienced men with ability to promote and produce sales.

Write fully, giving experience and expected compensation. Reply Box X116, Modern Plastics.

WANTED: A CHEMICAL OR MECHANICAL ENGINEER capable of taking full charge of a plastic plant in a foreign country. Address: A. Maurer Corporation, 3254 Lincoln Avenue, Chicago 13, Illinois.

MANUFACTURERS REPRESENTATIVES WANTED: Midwestern molder featuring ultra-modern molding equipment for thermosetting materials desires additional sales representatives; commission basis; specialty houseware handles and hardware, etc. Reply Box X128, Modern Plastics.

RESIN MANUFACTURER wants Representatives: experienced in sales UREA Resins—liquid and powder, for furniture, plywood and paper trade, etc. Will make permanent commission or salary arrangement, or both, as desired. New England and Middle West territories open. Confidential. Our men know about this advertisment. Reply Box X127, Modern Plastics.

SALES MANAGER WANTED—Large Ohio custom molder—with complete injection and compression equipment, as well as continuous laminating facilities—is expanding its sales organization. Candidates must have proven accomplishments in the sale of custom molded parts and in sales management. This is definitely an opportunity job. Send complete resume and salary requirements to General Manager, Continental Can Company, Inc. Plastics Division, Cambridge, Ohio.

MAINTENANCE MAN—for Injection Molding Machines. Must be good machinist thoroughly experienced with Reed-Prentice, DeMattia and Lester machines. Modern Plant in Metropolitan area, convenient to transportation. State age, experience and present earnings. Reply Box X145, Modern Plastics.

ENGINEERS—PLASTICS MOLDING: Attractive opening for men in Engineering Department of well established Eastern Plastics Molder. Training and experience in either the Low Pressure field or in Injection, Transfer, and Compression fields necessary. Process and Supervisory Engineers needed. Send detailed resume and state availability and salary requirements. Reply Box X143, Modern Plastics.

PLASTIC PLANT MANAGER WANTED: One of the leading plastics plants specializing in extrusion wants a top man with considerable experience in plastics to take over plant management and research. Age between 30-45. Only man whose experience and reference shows highest caliber of character and basic experience need apply. Application kept in strictest confidence. Reply Box X152, Modern Plastics.

Situations Wanted

VINYL FILMS - COATED FABRICS — Twenty years experience in development and production. Man in early forties with chemical engineering background desires location preferably in New York area. Excellent record in plant management. Complete knowledge of specification, purchase, installation and operation of all latest type equipment for manufacture of films and coated fabrics. Thorough knowledge of all products in this field—ability to handle customers technical service problems. Please address reply to Box X117, Modern Plastics.

MECHANICAL ENGINEER—Recent graduate, presently employed by injection molding company, desires an opportunity for advancement and better use of his abilities. Capable in both engineering and administrative positions. Available at once. Reply Box X123, Modern Plastics.

ATTENTION: MEXICO, LATIN & SOUTH AMERICA

Man available. 15 years practical experience in injection molding as foreman, superintendent, plant manager, etc. Extensive experience in instructing new help, plant layout and setup, maintenance, mold design, etc. Best of references from leaders in the plastics business. Reply Box X137, Modern Plastics.

PLASTICS ENGINEER, experienced glass reinforced laminates, contact, low and high pressure, polyester, methacrylate vinyl; thermoplastics processing, planishing, extrusion, forming, fabrication; wire and cable covering. Know materials, equipment, methods, applications. Also research, testing, process control, supervision, estimating, procurement, planning. Seek development, project leadership, technical sales, production responsibility. Ch. E. Columbia 1937; 34, family. Reply Box X136, Modern Plastics.

(*Continued on page 306*)

CLASSIFIED ADVERTISING

(*Continued from page 304*)

SALES AND GENERAL MANAGER Currently employed by top rated injection compression molder doing custom and proprietary business. Will develop both phases through correctly established representation. Have reduced production costs fifty per cent by modern mold design, pin point gating, improved finishing technique and over-all "know-how". Resume or personal visit upon request which will be held confidential. Reply Box X139, Modern Plastics.

Situations Wanted

EXTRUSION MAN, 10 years experience, thoroughly versed in upkeep of machines; can design dies, adapters and jigs; can blend colors; have run most thermoplastics in rods, tubes and shapes; Will go anywhere with a future. References. Reply Box X144, Modern Plastics.

AVAILABLE
CREATIVE SALES EXECUTIVE
This man has over 20 years experience. He is the type that rarely makes a change. Background includes buying, selling, creating and designing, development, advertising for several leading molders. Equally experienced selling industrial and consumer outlets. Art training and technical knowledge combine to produce beautiful low cost products. Ideas ready for aggressive company that can produce quality competitively. Prefer Eastern location. Rely Box X147, Modern Plastics.

Miscellaneous

A WIDE AWAKE FABRIC CONCERN selling yard goods wishes to connect with a mill able to produce imitations of soft plasticized leathers, such as kid or suedes. Basic cloth soft sheet leatherized on both sides; goods needed in black and colors. Reply Box X154, Modern Plastics.

WE HAVE approximately 8,000 plastic containers available in the shape of a small open book and also 8,000 boxes available in the shape of a small bell. These may be had at a greatly reduced price. For samples and prices, reply Box X103, Modern Plastics.

SALES REPRESENTATIVE CALLING ON MANUFACTURERS AND LARGE DISTRIBUTORS IN NEW YORK AND NEW ENGLAND AREA WILL REPRESENT MANUFACTURER OF RAW MATERIALS OR FINISHED PRODUCTS ON COMMISSION BASIS AND PROTECTED TERRITORY ARRANGEMENT. MUST BE WELL RATED CONCERN WITH KNOWN OR OUTSTANDING PRODUCTS. MAXIMUM SALES EFFORT WILL BE PUT BEHIND GOOD LINE. REPLY BOX X142, MODERN PLASTICS.

MANUFACTURERS OR INVESTORS: Patented transparent or colored overshoe with pocket. Can be folded to fit into average woman's purse. Rapid turnover merchandise. Suitable as chain- and department-store item. Patent owner wishes to contact interested party for developing of overshoe on mutually agreeable basis. Reply Box X149, Modern Plastics.

WANTED: INJECTION MOLDING PLANT. WILL LEASE MOLDING FACTORY IN METROPOLITAN AREA WITH OPTION TO PURCHASE. MUST BE IN PERFECT CONDITION. REPLY BOX X130, MODERN PLASTICS.

BRITISH MANUFACTURER desires to make an arrangement with either an American Manufacturer, Manufacturer's Agent or Business Consultant with a view to a regular exchange of ideas etc. to their mutual advantage. Write Mr. S. Stein, 23 Chadwick Road, Westcliff-on-Sea, Essex, England.

WE ARE INTERESTED in leasing, with possible purchase, one plastics molding plant in southern Pennsylvania, Ohio, Indiana, or southern Michigan. We are most interested in a plant that has "EMCO" machines of various sizes that are in good condition. All replies must be from major executives and information must be held in strict confidence. Reply Box X102, Modern Plastics.

FOR SALE: Complete wood flour mill. Capacity 10 tons per 24 hours, using nearby supply of pine and poplar. For further particulars address Box X112, Modern Plastics.

PLASTIC CASTING CORPORATION (Plastic materials and Industrial Castings) For Sale—fully equipped plant and office located, Newark, New Jersey. Cash required, about $4,000.00. Assets exceed sale price. Personnel changes are cause of sale. Reply Box X138, Modern Plastics, for appointment and inspection.

SELL US YOUR PLASTIC or related manufacturing enterprise in whole or in part. Land, buildings and/or equipment. Reply Box X159, Modern Plastics.

FLEXIBLE MOLD MAKERS HANDBOOK brings your tool & die shop up-to-date with the latest information on new flexible mold materials and methods. Copies mailed postpaid for only $1.00. Reply: Boruski, 505-B Fifth Ave., New York 17.

MODERN PLASTICS
ADVERTISERS

JANUARY, 1950

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A BRESKIN PUBLICATION

MODERN PLASTICS

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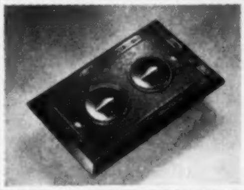
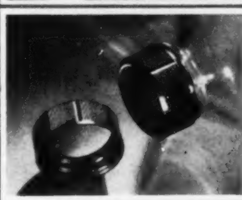
122 EAST 42nd STREET NEW YORK 17, N.Y.

HOW TO CHOOSE YOUR

GENERAL PURPOSE

PHENOLIC MOLDING COMPOUND

What do you make?		Properties you need	DURITE recommends
Household items— appliance housings, toilet seats, domestic wiring devices.		Good finish, moderate strength, fast cure, low cost.	For long draw: 560 For short draw: 528 Black or brown
Photo, sports equipment, toys—camera cases, developer trays and tanks, fishing reel parts, etc.		Good finish, moderate strength, fast cure, low cost.	For long draw: 560 For short draw: 528 Black or brown
Cabinets and cases, radio cabinets, novelty cases, playing card cases, etc.		Good finish, moderate strength, fast cure, low cost.	Walnut mottle: 606 Mahogany mottle: S-3261 Black or brown: 560
Telephone hand sets (and other parts requiring deep, black finish—piano sharps, etc.)		Good finish for buffing and polishing. Absence of specks.	For moderate strength: 525 For higher strength: 702 Black
Closures (Bottle caps)		Good finish, fast cure, good torque strength.	Stripping type: 539 Minimum odor: 650 Best finish: 651 Black or brown

For products that have to "stand the gaff", molders turn to DURITE, specialists in phenolics for General Purpose, Heat-Resistance, Electrical-Resistance, Impact-Resistance—and any special properties you require. Address:

THE BORDEN COMPANY · CHEMICAL DIVISION
Dept. MP-10, 350 Madison Ave.
New York 17, N.Y.

DURITE

Molding Powders · Binding Resins · Cements

ADVERTISERS INDEX

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Room for Improvement in Your Product?

Does your product lack the sales appeal that distinguishes a modern up-and-comer from a behind-the-timer? The chances are it could stand a Worcester Moulded Plastics approach.

To put their products up front with the leaders, hundreds of manufacturers all over the nation have turned to us for a revamping of an old product or a plastics approach to a new one.

With our extensive facilities and experienced personnel, plastically speaking, we successfully mould beauty, durability and utility into customers' products.

Since we neither manufacture nor market any product of our own, our moulding for you receives our undivided attention.

wmp

Custom Injection Moulding

WORCESTER MOULDED PLASTICS CO.

14 HYGEIA STREET, WORCESTER 8, MASS.

17 East 42nd St., New York 17, N. Y.